Maryut II

Mid-Term Evaluation of the Integrated Agricultural Development Project-Maryut Complex in the Western Desert of Egypt

Prepared for
U S Agency for International Development
Bureau for Global Programs, Field Support, and Research
Center for Human Capacity Development, Office of Policy Programs

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MARYUT II PHOTO SUMMARY

Integrated Agricultural Development Project-MARYUT
Complex in the Western Desert of Egypt
(MARYUT II)

Prepared for Global Bureau/R & D/R
U.S. Agency for International Development
Washington, D.C.

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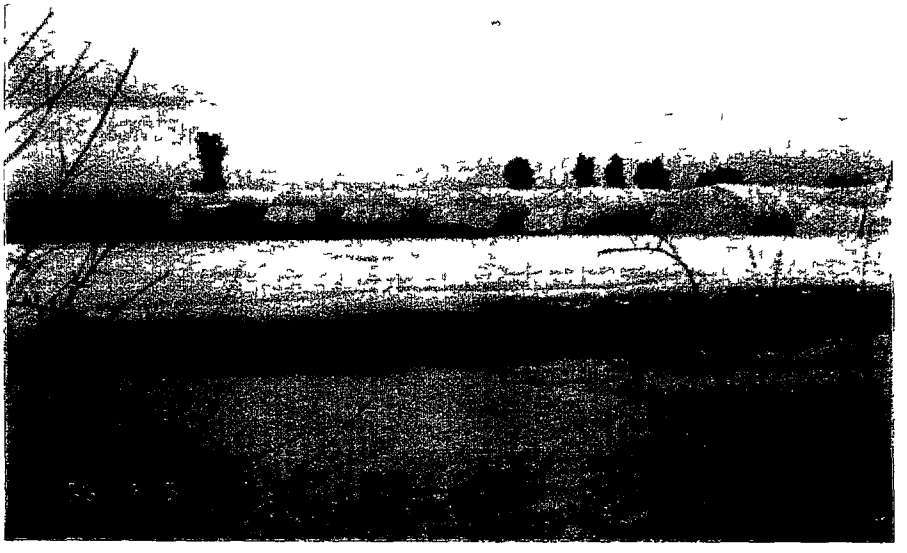


Protected Agriculture Located at the MARYUT Center
on Egypt's Western Desert

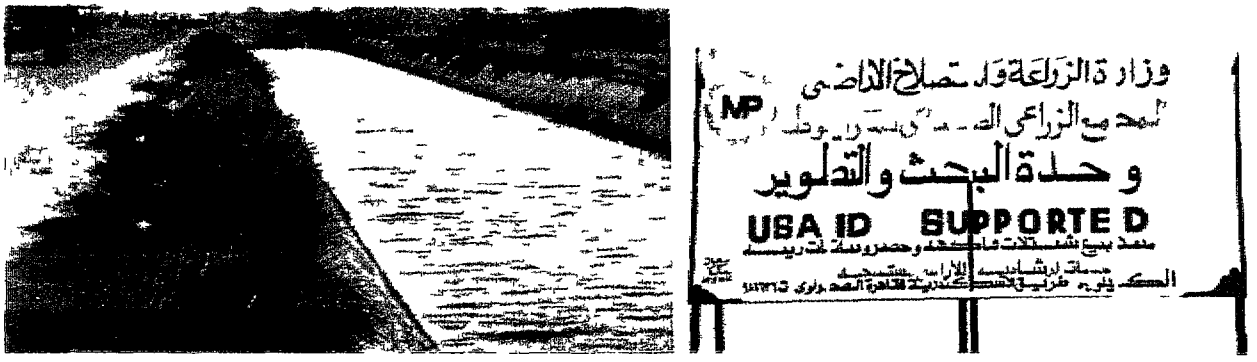
B

COOPERATION BETWEEN THE UNITED STATES, EGYPT, AND ISRAEL

MIDDLE EAST REGIONAL COOPERATION (MERC)
MARYUT AGRICULTURAL DEVELOPMENT PROJECT (MARYUT II)

MARYUT II was initiated in 1992 as a five-year project Work in Egypt is centered at the MARYUT site in Egypt's western desert on the Cairo to Alexandria desert highway, 54 km. south of Alexandria The primary site in Israel is the Ramat Negev Experimental Station which is located in the Negev highlands Promoting a spirit of cooperation between Israel and Egypt is the major purpose of the project while concentrating on the following joint research and development technologies 1) develop technologies for intensive agriculture production in Egypt's western desert, 2) develop models for the needs and capabilities of university graduates settling the new lands, 3) formulate production techniques to grow export quality produce, 4) produce quality nursery stock (fruit trees, vegetables, ornamentals, and landscape plants); 5) assist in development of agro-industry in the newly reclaimed lands, and 6) develop the MARYUT site as a center for extension and training. San Diego State University Foundation is the lead institution with Ben Gurion University of the Negev (Israel) and the Ministry of Agriculture and Land Reform (Egypt) as cooperators

The site of MARYUT II research in Israel opened in 1992, and is the driving force behind the agricultural development of the central Negev Desert of Israel Major program activities are geared to finding uses for saline water in desert agriculture The Egyptian site carries out applied research with the goal of providing local farmers with adapted plant materials and the knowledge and expertise needed for arid lands agriculture.



The above sign appears at the entrance to the MARYUT II research site in Egypt The canal by the site carries water needed for irrigation to the local area

The policy-making arm of the MARYUT II project is the Steering Committee, consisting of nine members, three from each participating country. The Technical Committee, composed of the scientists from the three countries, is responsible for the joint formulation of program annual workplans and for the follow-up of research results The results of the research conducted in both countries benefit both countries These efforts will help the Government of Egypt reclaim large areas of the Western Desert and Israel will benefit for its development of the Negev Desert

Tree crops and grape research are part of the research program (upper left) as is the development of new decorative and ornamental plants for domestic and export markets (center) Meetings of the Steering and Technical Committees enable participants to learn about the culture and history of each country (lower right)

The technologies developed through MARYUT research are utilized in both Israel and Egypt. Technologies from one country have benefitted the other, for example, "Williams" banana was introduced from Israel to Egypt, and a number of almonds (some U.S. varieties) have been introduced from Israel to Egypt. Landscape plants have been exchanged between countries, and the techniques for production of oyster mushrooms have been acquired by Israel from Egypt Most importantly, the project has created a respect between scientists of Israel and Egypt

In the desert near the Israeli Dead Sea, a farmer shares his production techniques with the MARYUT II Project Coordinator, Dr Mohammed El-Assal (upper left) Low-cost structures suitable for nurseries are tested and demonstrated on the Egyptian MARYUT site for application by resettlement farmers (center) Families of resettlement farmers will have better living standards by applying MARYUT technologies (lower right).

E

The fruit tree program at MARYUT has been very successful, and the Center is reputed to have the largest collection of fruit tree germplasm in the Middle East Tree fruits are a natural area of emphasis for the center since the new lands of the western desert provide more than 60% of the fruit consumed in Egypc. The fruit tree program has benefitted by excellent collaborative efforts by Egyptian and Israeli scientists The orchard includes apples, peaches, almonds, apricots, plums, loquat, olives, papaya, bananas, date palms, and charoub More suitable cultivars are being developed for production in the Mediterranean desert area.

Production of cut flowers for winter marketing are being developed, as are woody plants for flowering and decorating branches.

Williams Banana has been introduced from Egypt to Israel (right), and oyster mushroom technology from Egypt to Israel (upper) The tree fruit program is successful on the MARYUT site (lower left)

Scientists working on the project are motivated and trying to make a difference with their work Five women serve as key technicians in Egypt, and two Israeli women serve on the Israeli team (one as a scientist, one on the Steering Committee). Facilities at the MARYUT site in Egypt are very impressive, and the recent completion of a Soil Productivity Laboratory will enhance the extension capability to the Egyptian resettlement farmers. The 4,000 square foot laboratory, located at the entrance to the site, includes four lab rooms dedicated to soil and plant preparation, salinity analysis, measurements, and sample analysis The building also contains a computer room, a storage room, a library, and a meeting room

Scientists in both countries are enthusiastic about their work Egyptian scientists (lower left), Dr Dov Pasternak is an Israeli scientist and the MARYUT Coordinator for Israel (upper left) The new Soil Productivity Laboratory in Egypt is just becoming operational (right center)

The Egyptian Government has a resettlement program which provides young college graduates (of any discipline) a small tract of land, along with irrigation and housing assistance The resettlement farmers are a major target of the MARYUT Center The center will provide, at a low cost, productive plant materials, technical assistance to grow the crop, as well as placing the young farmers in touch with a buyer The center is now well-developed, and scientists are beginning to direct their efforts to assisting these resettlement groups The soils of the area are calcareous and difficult to manage; thus, the technology available through the center is vital to the success of these resettlement farmers The information and the center, although developed for resettlement farmers, are available to all farmers (large and small) in the region

The MARYUT Site Director, Dr Awad Hussein, shows some of the production to a visitor (upper left). Tree fruit materials and technology are shared with farmers in the region (center) Cut flowers are an important component of MARYUT II

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GLOSSARY

SOW	Scope of Work
USAID	United States Agency for International Development
MERC	Middle East Regional Cooperation Program
MOA	Ministry of Agriculture
MALR	Ministry of Agriculture and Land Reform (Egypt)
GARPAD	Agency for Land Reclamation Settlement (Egypt)
CALAR II	Cooperative Arid Land Agriculture Research II Project
SDSUF	San Diego State University Foundation
Feddan	A land measure used in Egypt, 4,200 square meters or about 1 04 acres
MASHAV	Israel Ministry of Foreign Affairs
Kibbutz	Communal settlement of Israel
Maryut II	USAID funded Integrated Agricultural Development Project, main site is the Maryut Agroindustrial Complex in the Western Desert of Egypt
Moshav	Israeli agricultural villages where each family lives in its own home and works its own plot of land

EXECUTIVE SUMMARY

THE PROJECT

The objective of the Integrated Agricultural Development Project-Maryut Agroindustrial Complex in the Western Desert of Egypt (Maryut II), is to foster cooperation between scientists and technicians of Egypt, Israel, and the U S in arid lands horticultural research The focus is on the development of a research and training center at the Maryut site in Egypt's western desert The Maryut II project was funded in 1992 for $4,939,000 (LOP) by USAID through the Middle East Regional Cooperation Program (MERC) The purpose of MERC projects is to promote cooperation between Egypt and Israel while meeting the following development objectives 1) develop technologies, species, cultivars and methodologies for intensive agricultural production in Egypt's western desert, 2) develop farm settlement models geared to the needs and capabilities of the university graduates, farmers, and others who will settle these lands, 3) formulate production techniques that will yield products of export quality, 4) produce quality nursery stock of fruit trees, vegetables, ornamental, and landscaping plants, 5) assist in agro-industrial development in the newly reclaimed lands, and 6) develop the Maryut site as a center for training and extension

The project contractor is the San Diego State University Foundation (SDSUF) under a cooperative grant from USAID with major sub-grants to the Ministry of Agriculture and Land Reclamation (Egypt) and to Ben-Gurion University of the Negev (Israel), under the joint Egypt-Israel Agricultural Committee

THE EVALUATION SCOPE

The scope of work calls for a team to evaluate three major areas of concern management, cooperation, and technical progress toward meeting the stated subproject objectives on schedule The team consisted of an agronomist/research management specialist (team leader) a horticulture/protected agriculture expert, and two AAAS Fellows assigned to USAID

THE METHODOLOGY

The team reviewed of project documents prior to leaving for the Middle East and interviewed representatives of USAID, Winrock, and SDSUF, as well as U S scientists involved with the project The team leader interviewed personnel of the SDSUF in their home office and interviewed U S scientists at the University of California, Davis Country coordinators were visited in Israel and Egypt, and visits were

made to all major sites where research was being conducted Israeli and Egyptian scientists gave reports of their research, and many were interviewed separately by one or more team members The Maryut site was visited and interviews conducted with the scientists working on the project Farms utilizing Maryut II technology were visited

THE SUMMARY CONCLUSIONS

1 The project is on schedule, meeting the objectives and time-frames called for in the proposal Initial success has been realized in extension/outreach activities (although little of the outreach work has been with resettlement farmers)
2 The project is meeting its sub-project technical objectives Scientists from Egypt, Israel, and the U S are working together to establish the Maryut Center as a research, demonstration, and training site
3 While several Egyptian and Israeli scientists have been able to identify and work with specific counterparts from the other nation as a result of this site-directed project, much of the research is still conducted in parallel in accordance with each nation's own priorities They are working together to meet the demands of the project
4 SDSUF and the Egyptian and Israeli subcontractors are doing an effective job in directing the work of the project The monitoring efforts of the Technical Committee (scientists meeting as a committee of the whole and in subcommittees organized according to areas of expertise) contribute to improving project operation The Steering Committee needs to give greater attention to these recommendations to see that they are implemented Peer evaluations by scientists involved in the project contribute to project success
5 Protected agriculture will continue to expand in the western desert of Egypt due to policies of the Egyptian government The development work of the Maryut II project will help farmers develop sustainable operational and management procedures
6 Women are serving key roles in the project, although no Egyptian women (Ph D level scientists) are involved
7 There are many donor organizations working with the resettlement farmers with little apparent coordination of efforts The Maryut II project work could be complemented by collaboration with some of these organizations
8 No organized training program exists to meet the needs of the resettlement farmers, although many on-site training sessions have been conducted This component of the project must receive high priority for the project to be a success

9 Personnel of the USAID Mission and U S Embassy in Egypt have visited the site and are interested in its progress The project should maintain a liaison with the USAID Mission, especially to cooperate with the new horticultural marketing project

10 An effective training and marketing program should be available to those resettlement farmers who have purchased plant materials from the center

11 The project needs marketing expertise to provide a full package to resettlement farmers The inclusion of a marketing specialist on the Technical Committee is a step in the right direction The services of a local marketing specialist, knowledgeable in both domestic and export markets, should be obtained

12 U S scientists have played a major role in the success of the project

13 The soils and fruit crops programs of Maryut II were especially impressive and well-directed

14 The presence of a resident Israeli technician at the Maryut site was a valuable asset in the early phases of the project, since this promoted rapid exchanges of site information and technical expertise from both directions, as well as establishing an expectation of collaboration Once the technical goals were achieved, it was proper to remove the technician, as provided in the project design, and to focus exchanges at the senior scientist level

SUMMARY RECOMMENDATIONS

1 The extension/outreach activities should be expanded to reach more resettlement farmers The project should increase efforts to identify MALR extension personnel who can work with the center

2 A specialist in marketing (domestic and export) should be added to the Egyptian expert staff of Maryut to assist with the marketing training and service program for resettlement farmers The strategy for reaching resettlement farmers (providing plant materials, technical assistance, and buyers) suggested by the on-site Director should be developed and implemented The marketing expert should be an integral part of the training team

3 The station should focus on fewer enterprise packages and concentrate on developing them for the benefit of the resettlement farmers

4 The Maryut site Director should work with the joint Israel/Denmark/Egypt program, which offers courses in Israel and in Egypt for resettlement farmers This could provide a source of training assistance and a chance for true collaboration between Egyptian and Israeli professionals GARPAD, the MALR, and the

parties of the current tri-national agreement (MERC Project) should express their clear interest in and support for this cooperation

5 Soils and fruit crops programs should serve as focal or anchor points for the station because they are already well-developed and could have a significant impact for the region

6 Collaboration between scientists and technicians of Egypt and Israel is one of the chief outputs desired from the project The contractor and sub-contractors should identify technical areas of collaboration that provide for extended visits of "exchange scientists" (reciprocal visits of Egyptians to Israel and Israelis to Egypt) The concept could even be formalized as rotating "resident scientist" positions (for an Israeli scientist at Maryut and an Egyptian counterpart at the Ramat Negev Station) This would promote direct collaboration and an increased familiarity with each other's sites and methodologies and would insure a degree of reciprocity

7 The Project Site Director should maintain contact with the USAID Mission to identify areas where the project may be complementary to Mission priorities and programs (such as the new horticulture marketing program)

8 The Steering and Technical Committees should move immediately to develop a long-range plan (5-year plan, for example) that addresses the issue of project sustainability

9 Recommendations and scopes of work for specific crops should be developed through close coordination and planning with the Technical Committee

10 Each investigator should be required to supply an annual report that would allow tracking of progress toward their specific research goals

11 Future projects should consider having one Steering Committee with technical membership as needed for technical guidance

12 The evaluation team recommends continuation of the project

MAIN LESSONS LEARNED

1 Collaboration between countries can provide solutions to problems common to both entities Equal exchanges of scientists and technicians between the two countries should be maintained whenever possible

2 Future projects should include more specific guidelines (criteria) on protocols for providing assistance to farmers In the past, sub-project objectives have lacked specificity so that project personnel could be held accountable for implementation (or the lack thereof)

3 Future projects should include more specifics about the technical sub-projects including a more complete scope of work to be done When virtually all possible crops, agrotechniques, and cropping

schedules are included in the sub-project objectives, it is hardly fair to criticize project personnel for lack of focus

PROJECT IDENTIFICATION DATA SHEET

Integrated Agricultural Development Project-Maryut Agroindustrial Complex in the Western Desert of Egypt (Maryut II)

Project Number 398-0158 27

Life of Project Funding. U S $4,939,000

Project Activity Completion Date: 03/31/97

Objectives The project research objectives are protected agriculture, open field intensive crops research, tree crops and grape research, post-harvest handling, training, extension, nursery, and development in Israel of new plants for the local and export markets

Project Description Maryut II will develop technologies, species, cultivars, and methodologies for intensive agriculture production in Egypt's western desert, develop farm settlement models geared for the needs and capabilities of the university graduates, farmers, and others who will settle these lands, formulate production techniques that will yield products of export quality, produce quality nursery stock of fruit trees, vegetables, ornamentals, and landscaping plants, assist in the development of the agro-industry in the newly reclaimed lands, and develop the Maryut site as a center for extension training

Project Purpose To promote the spirit of cooperation between Israel and Egypt while meeting the stated development objectives stated in the project description

USAID Inputs Professional, technical resource specialists, project administration, research operations including equipment, supplies, and research facilities, and state-of-the-art technical information

Project Outputs Crop production technologies and materials, farm settlement models, and training capability

Required Reports Semi-Annual Technical/Progress Report, Annual Technical/Progress Report, Quarterly Reports, Final Report and Special Reports

Previous Evaluation An internal evaluation took place in 1994 in conjunction with the meeting of the Technical Committee Meeting (all scientists of the project) An internal evaluation was also conducted in Sept 1993

Involved Institutional Contractor San Diego State University Foundation (Grant Agreement)

I. PROJECT BACKGROUND, PURPOSE, AND OBJECTIVES

A. Background

The purpose of the Maryut II project is to bring together Egyptian, Israeli, and American agricultural scientists and technicians to cooperate in arid lands horticultural research, with a focus on the development of a research and training center at the Maryut site in Egypt's western desert The Maryut II Project is funded by USAID through the Middle East Regional Cooperation Program (MERC), which began in FY 79 in response to a congressional initiative that sought to give support to Arab/Israeli relations in the wake of the Camp David Accords

The Maryut site is on the west side of the Alexandria-Cairo Desert Highway, 54 km south of Alexandria It is one of 28 research and extension centers that focus on particular soil, climate, and water conditions characteristic of various areas of the new lands and is part of the Egyptian government's larger agricultural land reclamation and development initiative The soils of this site are high in calcium carbonate and are difficult to manage agriculturally They are typical of soils encountered west of the site, even as far as Libya These soils represent a major soil management challenge The development of these new lands for agriculture is a socio-economic priority for Egypt They are being used to 1) provide resettlement opportunities for small farmers from the overpopulated Nile delta region, 2) provide a place for large numbers of university graduates to settle and work in lieu of being placed on a long waiting list for government jobs, and 3) develop private enterprise in the agricultural export sector

Development of the Maryut site began in 1983, with a conference of international scientists brought together by the Albert Einstein Peace Prize Foundation A project plan was developed that led to the establishment of the site with a 60-feddan research and development center (plans originally called for an additional 2,000 feddan tract)

A project review in 1990 indicated that the project had brought about a working-level scientific cooperation between the two countries, as well as a degree of policy and administrative coordination between Egyptian, Israeli, and U S agencies and scientists Because of the arid conditions prevailing in both countries water conservation and the production of high value horticulture crops under protected agriculture was included as one of the areas of emphasis for the Maryut II Project In addition because of the applied nature of the project and its use of the Maryut demonstration site, the extension component of the project was strengthened to insure that farmers and university graduates settling in the area had access to the technology being developed and to proper training Maryut II was approved in May

1992, and has a scheduled completion date of March 1997 The implementing agency, through a grant agreement of $4,939,000, is the San Diego State University Foundation (SDSUF) with cooperation in Egypt (of the Ministry of Agriculture and Land Reform, Agricultural Research Center and Ain Shams University) and Israel (Ben Gurion University, Hebrew University of Jerusalem, and the Agricultural Research Organization of the Ministry of Agriculture)

The project is administered by a nine-person Steering Committee, with three members each from Egypt, Israel, and the United States Three project coordinators are directly responsible for project activities the U S coordinator for overall planning and communication, and the Egyptian and Israeli coordinators, for activities in their respective nations A project director is on site, and is responsible for day-to-day activities Much of the Israeli research is conducted at the Ramat Negev Station in the Israeli desert

MERC projects are based on the premise that people who work together in a collaborative manner are more likely to reach their common goals while developing a greater knowledge and understanding of each other and of their respective cultures and heritage Participating country sectoral development programs that bring together national expertise in a collaborative manner are strengthened and enhanced by regional cooperation Successful regional cooperative programs can help attract additional financial resources (public and private) for common economic or social development programs

B Project Goals and Objectives

The overall goals of the Maryut II project are to foster cooperation among Egyptian, Israeli, and U S scientists, to strengthen institutional linkages among the cooperating countries, and to focus on problems faced by a growing population of modern desert farmers throughout Egypt's western desert The results may also be applied by farmers in Israel's arid regions The main objectives are

- To cooperatively test and develop technologies, species, cultivars, and methodologies for intensive agricultural production in Egypt s western desert
- To cooperatively test and develop models of small farm settlement geared for the needs and the capabilities of the university graduate farmers and others who will settle those newly-developed lands
- To jointly formulate production techniques and post-harvest treatment of outputs aimed at high-quality products that will serve

as a basis for future exportation of competitive quality products from Egypt to Middle East and European countries

- To work together to produce high-quality nursery stock of fruit trees, vegetables, ornamentals, and landscaping plants as a means for disseminating research results
- To assist in the development of an agroindustry for the newly-reclaimed lands
- To develop the Maryut site as a center for the training and extension for the new farming communities being established in the vicinity

The research and development unit at the Maryut site will concentrate on adaptive research and development, which is divided into the following categories 1) protected agriculture, 2) open field intensive crops, 3) fruit trees and grapes 4) the nursery, 5) post-harvest handling, 6) model farms, and 7) training and extension

II. EVALUATION SCOPE OF WORK AND METHODOLOGY

A. Purpose of the Evaluation

The Maryut II agreement commenced on August 10, 1992, and has a completion date of March 31, 1997 The mid-term evaluation is intended to determine whether expected progress has been made toward the objectives of the subprojects and whether annual work plans were realistic and successfully implemented The effectiveness of the Steering Committee and Technical Committee method of management is to be analyzed The evaluation will determine the extent to which the project has met the Congressional mandate for the MERC program to foster cooperation and collaboration between Israel and Egypt Specific attention is to be given to determining the nature and extent of this cooperation and whether the project activities are conducted in parallel or are truly collaborative

B. Literature reviewed

Prior to departing for Israel and Egypt, the team met at Winrock office in Arlington, Virginia to review appropriate documents provided by Winrock and USAID A list of significant documents reviewed appears in Appendix C

C Interviews with U S. Implementors

The team met with the USAID Maryut II Project Officer, other representatives of USAID, and Winrock personnel The team leader interviewed administrative personnel of the SDSUF in their home

offices and had personal or phone interviews with three U S Technical Committee members Those interviewed are noted in Appendix B

D. Site Visits

Israel. Site visits were made to Volcani Center and the Ministry of Agriculture at Bet-Dagan, Ben Gurion University of the Negev and The Institutes for Applied Research at Beer-Sheva, Ramat Negev Experimental Station (including Kibbutz Rivivim and one Moshav using Maryut II technology), and a farm where Maryut II/CALAR II technology is being used in the Arava Valley near the Jordan/Israel border south of the Dead Sea

Egypt Maryut II site and institutions where work to support the project exist were visited, including Ain Shams University, National Research Center-Dokki, University of Alexandria, and El-Bouseilly, Agriculture Foreign Relations Office of the Ministry of Agriculture, and the Board Office of the Agriculture Research Center of the Ministry of Agriculture

E. Interviews with Participants, Implementors, and Recipients

Scientists in Israel and Egypt presented summary reports of their research, followed by team questions When possible (about 60% of the time), two members of the team interviewed scientists about the non-technical components of the project (collaboration, success, interactions between scientists, and general program reactions) Country coordinators and Steering Committee members were interviewed as were others who had a significant role in the project The itinerary of the review team is included in Appendix D

F Evaluation Team Composition

The evaluation team consisted of the following

Dr Rodney J Fink, an Agronomist/Agricultural Management Specialist/Team Leader

Dr Mary Peet A Professor of Horticulture Science at North Carolina State University/Protected Agriculture Expert

Dr JoAnne Garbe, American Association for the Advancement of Science Fellow, assigned to USAID DVM and J D degrees

Dr David O Brien, American Association for the Advancement of Science Fellow, assigned to USAID, Engineer/Science Specialist,

III. MEETING TECHNICAL SUB-PROJECT OBJECTIVES

The information in this section is based on site visits, interviews, abstracts provided, project newsletters, the September 1993 Maryut Internal Evaluation, the 1994 Maryut Project Achievements, and the Minutes of Technical Committee meetings from July 1994

A. General Findings

Overall, both the Israeli and Egyptian components of the research and development efforts at Maryut seem to be going well Once equipment is installed in the recently completed 4,000 square foot Soil Productivity Laboratory, the center will be poised to provide research and extension information and technology for the newly reclaimed lands The Egyptian segment of the projects focuses on 1) saline water utilization on heavy calcareous soils and 2) improving the efficiency of land and water use for crop production Saline water utilization is the focus for all Israeli projects, although they all also contain a strong crop quality improvement component

Israeli and Egyptian researchers collaborate closely and share technologies and germplasm For example, meshing of research interests and personnel cooperation between Egypt and Israel has made fruit crops one of the most impressive elements on the Maryut station Similarly, in the area of on-farm salinity and soils management, there has been close cooperation and commendable sharing of expertise Preventing salt buildup is critical not only to the sustainability of production on the farm but also to sustainability of agriculture in the entire region The Team recommends that efforts to monitor and prevent salinization be given continuing attention and the utmost priority

The morale of project personnel at the station also seems high A team spirit is evident, with workers at all levels made to feel important

Several aspects of research are being incorporated into an expert-systems model being developed by the Central Laboratory for Agricultural Expert Systems, Ministry of Agriculture, located at Dokki These efforts should be encouraged Although it is often difficult to predict the accessibility or utility of expert systems in Egypt or elsewhere, the discipline necessary to incorporate research material into the model is often useful The development of such a system also highlights gaps in available information, which should further focus research efforts

On the basis of the information presented and on reports of the Technical Committee reviewed by the team, research is ongoing on many crops and in many disciplines While this diversity of efforts is to be applauded as a sign of energy and hard work on the part of all

concerned, this may also be a time in the life of the project when a greater focus is needed on particular cropping systems The Technical Committee has made several recommendations to this effect, but as yet those recommendations have not resulted in a noticeable change in the focus of the site The addition of a marketing specialist to the Technical Committee is a sign that greater attention can be given in the future to the crops most profitably grown and marketed by the small-scale growers targeted for this project The Evaluation Team also wants to emphasize that the recommendations of the Technical Committee, particularly after the addition of a marketing specialist, be fully considered in Maryut planning decisions When it is not possible to implement these recommendations, some justification should be provided to the Steering Committee

Greater focus on fewer cropping systems would also simplify the job of packaging the information already developed at Maryut into brochures and other media forms useful to farmers Since the project is mid-way through its expected life, this extension activity should be given a high priority

The following discussion is divided into sub-projects as presented in the original proposal (except for soil management and irrigation, as noted below) The studies described are indicative of the work going on, but not all these activities were viewed by the Evaluation Team Material presented here was taken from technical and progress reports In some cases it was difficult to distinguish between work that had taken place, work that was underway, and work that was only in the planning stage Raw data provided were not easy to summarize, and summaries, if provided at all in written form, were not detailed enough to analyze Thus it is difficult to evaluate the exact scope or quality of the work that has taken place Relatively few statistics were provided to verify success in terms of reaching specific goals

B. Soil Management and Irrigation at the Maryut Site

Although not a specific sub-project presented in the original proposal, soil management activities on the Maryut site have received considerable emphasis This was a critical decision because variability of the soil at the site makes it difficult to work

The soil at the site contains high and variable levels of calcium carbonate as well as significant levels of soluble salts, which made the selection of the site somewhat controversial, as it neither matched the "New Lands" currently under development in Egypt nor conditions encountered anywhere in Israel Several scientists, particularly Israelis, were quick to point this out On the other hand, however, the soils are apparently representative of those found in the next phase of development of Egypt's Western Desert, the lands further to the west,

which will open as a result of the extension of the Nassir Irrigation Canal The Maryut Project gives scientists and the MALR some lead time in developing suitable crops before farmers attempt to settle those areas Second, the soils represent perhaps the toughest challenge of the New Lands Settlement Program, and, as such, provide a suitable technical problem for agricultural experts from all three nations involved in the Maryut II Project

The evaluation team found the soil management work to be well done It should make a contribution to these lands, especially after the soil analysis laboratory goes into operation on the site

The detailed soil survey of the site included descriptions of 45 soil profiles as well as the soil physical, chemical, and mineral analysis Maps showing the distribution of salinity, calcium carbonate, the clay content of the soil, and the level of the water table were also developed This characterization was followed by a series of recommendations as to soil cropping and management on the site

A number of field experiments were conducted to see how the soils could be improved by organic matter additives Mixing cattle manure at a level of $5m^3/540m^2$ into the surface 30 cm layer was better than subsurface manure applications Adding organic matter improved soil physical properties such as bulk density and soil porosity Levels of zinc were decreased, however, and reports suggest it may be necessary to mix micronutrients with the organic matter to ensure zinc availability

Several types of irrigation studies have been conducted The effects of lateral inlet pressure on the performance of various emitter types were estimated, and the effects of single and double source lateral inlets on irrigation uniformity (under sloping and level field conditions) were compared The double inlet system resulted in higher uniformity of emitter discharge and pressure, on both level and sloping fields, compared with the single inlet system Another advantage of this system was that the second inlet can be used to flush the emitters

Experiments were also conducted on optimizing the media filters for the irrigation system in terms of pressure head losses, water flow rate across the vertical filter, accumulated filtration time, and efficiency of filtration Increasing the media thickness reduced the pressure and water flow through the system, but also reduced the sedimentation rate of the filter Highest filtration efficiency was obtained by using a thick layer (26 cm) of fine (2 mm diameter) media between two equal layers (26 cm each) of coarse (5 mm diameter) gravel

The effect of emitter clogging effects on the lateral inlet pressure and system back pressure was studied It was concluded that up to 20% of the emitters could be clogged without posing serious problems to the

system To prevent clogging, it was recommended that higher flowrate emitters (8 liter/hr) be used and that the system be maintained by running nitric and phosphoric acid solutions through the partially clogged emitters Phosphoric acid minimized clogging problems due to carbonate, phosphate, and sulfate precipitation at a high pH

C. Development of Cut Flowers for Winter Marketing and Evaluation of Indoor Foliage Plants

Maryut Site, Egypt

A propagation nursery has been set up for the following foliage plants *Ficus benjamina*, *Ficus* 'Hawaii', *Syngonium*, *Pothos*, and *Schefflera*. Cuttings are taken from stock plants and rooted

The following studies of roses, carnations, tuberose, gladiolus, and Bird of Paradise have taken place the effect of different levels of manures and different pruning dates on growth and flowering of roses, the effect of methods of pinching and levels of fertilization on carnation, the effect of irrigation water regime on gladiolus, and the effect of different levels of manures and shading on Bird of Paradise

At the Maryut II Technical Committee meeting held in Cairo, June 1994, it was suggested that carnations be replaced with high-value tropical or subtropical flowers, such as anthurium and heliconia (as suggested in previous work plans) Both standard and miniature carnations are currently being grown It is not clear if conditions will be cool enough for satisfactory production of carnations, according to the Technical Committee evaluation, although the quality of the miniature carnation planting viewed by the Evaluation Team in January was very high

Ben Gurion University of the Negev, Institute of Applied Research, Beer-Sheva, Israel

Limonium is thought to have potential as a cut flower for competitive winter marketing The attractive Japanese *Limonium* hybrid being used can be grown quickly in open fields under highly saline conditions such as the Arava Valley, which occupies the rift south of the Dead Sea after establishment on freshwater Four salinity levels were tested representing levels commonly found in the Arava Valley The effect of salinity on flower production and quality in terms of shelf life was measured Tissue culture propagation of this material was being investigated, but is quite expensive, so new procedures for vegetative propagation are also being investigated

D Native Annual Plants for Environmental Gardening

Maryut Site, Egypt

Plants introduced for evaluation as landscape ornamentals include 7 groundcovers, 4 short shrubs, 5 tall shrubs, and 5 tree species A list of plants to be acquired from nurseries in California or Arizona was sent to San Diego This list included 53 trees, 45 shrubs, 22 groundcovers, and 8 vines Data to be collected on these additional plants included rate of growth, tolerance to salinity and drought, methods of propagation, and the possible uses of these plants in landscaping on the station Seeds and cuttings of these plants will be collected and used to propagate material for sale and for research purposes Tree species were to be evaluated without irrigation In addition, Maryut staff plan to propagate different species of locally purchased trees, shrubs, ground covers, herbs, and indoor plants at the site

Ben Gurion University of the Negev, Institute of Applied Research, Beer-Sheva, Israel

Species studied include an orange-flowered *Gysophylus* as a potential crop for production in the Negev Cut flowers of this species have the ability to stay fresh for a day without water, but shelf life was improved by plastic sleeves to reduce water loss *Gysophylus* needs a 10-minute light break during the night to induce flowering during the winter, the period of high prices in the export market Buds induced by light breaks are sensitive to stress and aborted under unfavorable conditions, which may limit commercial development in the Negev If a power disruption precludes night break lighting for even one or two nights, the inductive effect may be lost, thus, a reliable supply of electricity may be a limitation for some growers Plants also responded well to CO_2 generators in the heated houses

E. Development of Woody Plants as Cut Flowers

This topic is discussed in the next section

F Eucalyptus and Other Shrubs for Flowering and Decorative Branches

Ramat Negev Site and Institute for Desert Research, Israel

Eight species of shrubs and eight eucalyptus species were planted in February 1994 Shrubs include *Acacia ballenana, A pupura,* and species in the family Myrtaceae Shrubs and eucalyptus in this trial were irrigated with 1 6, 6 6, 9 4, and 12 4 dS/m water to determine salt tolerance Each salinity treatment was replicated four times in a randomized complete block design High cost and lack of production

expertise still limit utilization of some of these species, but 400 dunams of eucalyptus were reportedly planted in Israel in the Fall of 1994, as a result of this research Approximately 40,000 cut branches/dunam/year are expected to be produced from this new planting

The commercial potential of *Equisetum* (scouring rushes) is also being explored Other species being developed for cut flowers include *Thamnus* and *Protea.* These species are hard to grow, and the goal of the project is to reduce such economic obstacles to production as the need to grow in greenhouses or nethouses

Maryut Site, Egypt

Only one of the eucalyptus species grown for flowering branches, *Eucalyptus torquata,* was successful at Maryut In contrast with eucalyptus, several of the *Melaleuca* species, in particular *M coccinea* performed successfully Of the species grown for decorative foliage, *E spathulata* was successful, and all the *Melaleuca* species did well *M lanceolata* was especially well adapted

G. Control of Tomato Quality

Ramat Negev Site, Israel

Irrigation of 'Desert Sweet' (line 144) tomatoes with saline water (1,900 mg/liter NaCl) after establishment increased glucose, aroma compounds (mostly monoterpenes), titratable acidity, and overall flavor Flavor was assessed by a taste panel Glucose was measured using a simple, inexpensive German refractometer ("Refrolux," developed for home diabetes testing) Glucose measurements with this unit were correlated with cultural management practices, with glucose content analyzed in the lab, and with flavor Analysis of monoterpenes was conducted by gas chromatograph/mass spectrophotometer Both indices (monoterpenes and glucose) appear to be good indicators of tomato flavor The effects of other ions (in addition to salt effects) may also be included in studies of practices to optimize taste in tomato

H Protected Agriculture

Maryut Site, Egypt

Organic Fertilizers: The use of organic fertilizers as a substitute for commercial fertilizers was investigated It was found that $5m^3$ of cow manure was the optimal application rate for a $540m^2$ greenhouse A sandponics system was also being used in one of the greenhouses In this system, which was also viewed by the Team at Dokki and Ain Shams University, the top 1 meter of native soil is replaced with imported sand The sand is separated from the native soil by a layer of

plastic Irrigation water provided to the plants is recaptured and recycled This further increases water use efficiency because no water is lost into the soil On the other hand, an inherent risk of all closed system is the gradual buildup of counter-ions for the nutrient elements taken up (as in Cl- from calcium chloride) and the risk of disease transmission to all the plants in the greenhouse Project personnel did not, however, report any problems with either imbalance of the nutrient solution or disease transmission at any of the sites, so the system seems to be working well at present The entire nutrient solution is discarded after several months of being replenished with more nutrient solution, and new solution is made up

Ramat Negev Site, Israel

Melons Melons were planted in September for harvest in mid-December during the period of high prices for export The hypothesis being tested was that pruning plants to one fruit per plant would increase soluble solids and that any reduction in fruit per plant would be compensated for by higher plant densities Currently, melons are planted at a density of 2,000 plants/dunam and four melons are harvested per plant For this study, melons were planted at densities of 2 4 (standard) 4, and 6 plants/m^2 Plants at the higher two densities were pruned to one fruit per plant Fruit quality and yield were highest at a density of four plants/m^2 Fruit quality and yield were not improved as much as expected by the single fruit/high density scheme so growers are being advised to grow at the higher concentrations but to allow at least two fruits to develop per plant

Tomatoes Planting times, density, pruning, and salinity effects on tomato production are being examined to determine ways to maximize production, improve fruit quality, and promote earliness in fruit for export Densities of 2,400 to 7,200 plants/dunam are being evaluated Quality is usually highest on the first trusses Topping after four trusses is being investigated as a way to reduce competition of later-set fruit with the first-set fruit Two earlier planting dates are also being evaluated for suitability for export Salinity treatments (control and 7 dS/m) are being examined for their effects on time-to-flower, date of first harvest and total yield Salinity treatments beginning at the time of transplanting are being compared with those beginning with anthesis of the first inflorescence At Ramat Negev, hot water is circulated through black tubes to simulate the effect of geothermal water begin considered as a heating source at one Kibbutz

Desert Research Institute, Israel

Research on solar greenhouses in Israel was a component of this project as well as another MERC Project (CALAR II) The basic concept is to store energy in water-filled plastic sleeves during the day and to

release the stored energy at night as a source of heat The most recent innovation in the project is the development of a plant growing area separated from the energy collection area by retractable thermal screens The plant growing area can be vented during the day as necessary to cool the plants At night heat loss is reduced by a moveable thermal screen to retain heat The water sleeves in the energy collection area are suspended in tiers on a metal frame to reduce heat loss to the ground and to increase airflow around the sleeves Temperature sensors control the movement of both the thermal screen over the plants and the screen separating the two parts of the greenhouse The design is very interesting It would be useful to have information on capital and operating expenses compared with a conventionally heated greenhouse

In Egypt, production in unheated plastic houses was compared with that in low plastic tunnels, large heated houses, and unheated houses that have water-filled sleeves on the sides or between plants Another modification of the large greenhouses being studied in Egypt was to lay clear plastic on the soil to warm it and to place plants in low tunnels within the house The low tunnels are opened during the day to improve air circulation and reduce shading, as is done when tunnels are used outside

I Open Field Intensive Crop Research

Maryut Site, Egypt

Several vegetable species not previously grown in the area were introduced successfully, including broccoli, cabbage, carrots, okra, and fennel Sweet corn and romaine lettuce trials were in their second year A multi-span 'Speedling'-type greenhouse was constructed to supply vegetable transplants for the project In the future, transplants will also be sold to local farmers

Four cultivars of artichoke were established Gibberellin treatments were initiated to force artichokes to flower during December when prices are high

A number of studies were reported with respect to cucumber production Cucumber plantings were difficult to establish because of seedling predation by rats Mixing ash into the seeds before planting decreases their attractiveness to rats Whiteflies were also a problem on cucumbers The effect of irrigation intervals and depth of irrigation lines on water use efficiency of cucumber and tomato was studied There was no significant difference in cucumber yield in surface and subsurface irrigated plants The high flow rate emitters (4 liters per hour) at a spacing of 0 5 m were best on the calcareous soils of the station A high irrigation frequency also worked best on these soils

For cucumber, daily irrigation was best An attempt was also made to determine the actual evapotranspiration of cucumber using empirical formulas such as Blaney-Cridle, radiation, modified Penman, and class A pan evaporation

Tomatoes were grown as a summer crop Problems experienced included irrigation management (too infrequent), post-harvest quality, and whitefly transmission of tomato yellow curled leaf virus Subsurface irrigation with leaky pipes at a depth of 25 to 39 cm appears optimal for the site Evapotranspiration studies are continuing on peppers, melons, and tree fruits Recommendations on frequency and rates of irrigation and emitter density and depth of placement are being refined These variables are being combined with organic manure variables (type, timing, application method, and placement) to determine how irrigation practices should be changed for organic manures For tomato irrigation every third day was best

Problems also were experienced in producing eggplant Fruits were seedy, with irregular shapes and a bitter taste Pruning the plants down to two to three branches gave some improvement Peppers were grown both in the open field and in greenhouses Hybrid seed was felt to be too expensive for open field production, but was recommended for greenhouses Stripping leaves off pepper plants in the field and re-fertilizing to encourage regrowth was also tried to see if a second crop of pepper could be produced without planting more seeds Too many pest problems were experienced with this regrowth practice, however to recommend it to growers

Ramat Negev Site and Institute for Desert Research, Israel

Melons In a variation of the sand dune agriculture practiced in historic times at the El Bouseilly site in Egypt melons which are traditionally grown on heavier clay soils, were grown on sand dunes with saline irrigation Melons were irrigated with low and high levels of salinity (1 6 and 6 6 dS/m) at frequencies ranging from six to nine times daily, but with the same total volume Increasing irrigation frequency in the high salinity treatment doubled yields compared with low frequency irrigation, presumably because soil drying was reduced and that lowered root zone salt accumulation In the low frequency irrigation treatments, salts built up, plants were stunted, and only the crown fruit set Fruit quality in the saline treatment was higher in terms of soluble solids and reduction in external fruit collapse, a physiological disorder Upwards of 15 melons/m^2 were evident in the better treatments The project was promising enough that next year 500 dunams of melons are scheduled to be grown on the Moshav Kadesh Barnea The highly profitable end-of-November market will be targeted

Potatoes: Potatoes were grown under five levels of salinity for two seasons In the drier of the two seasons, salinity decreased potato yields 30%, but the effect could be partially ameliorated by increasing the number of times the crop was irrigated each day Presumably this was because the root zone remained wetter, reducing salt deposition as the soil dried The 16 potato cultivars studied also differed significantly in tolerance to salinity, although all were somewhat salt sensitive compared with other crops probably because of high transpiration load During periods of high winds (Hamasein), the crop is particularly sensitive In the more salt-sensitive cultivars, the thickness of the cuticle appeared to decrease under salinity, resulting in water loss from the potatoes Drought-tolerant potato lines required less water during maturation, but were more sensitive to water given late in the season in terms of potato tuber cracking Use of low tunnels for potato production was found not to be cost-effective For the Ramat Negev area the best planting date appears to be February with harvest in June November-to-March cycles should be restricted to frost-free areas

J. Tree Crop and Grape Research

Maryut site, Egypt

The tree fruit program at Maryut has been very successful, and the Center is reputed to have the largest collection of fruit tree germplasm in the Middle East Tree fruits are a natural area of emphasis for the center since the new lands of the Western desert provide more than 60% of the fruit consumed in Egypt The project is concentrating on deciduous tree crops compatible with relatively warm winters and calcareous soils apples, peaches, almonds, apricots, plums, loquat, papaya, olives, bananas, date palm, and charoub Researchers on the project are also said to be developing new cultivars more suitable for production in Mediterranean desert areas

Various irrigation regimes were compared for a number of fruit tree cultivars Factors measured included types of irrigation systems (microjet sprinklers vs drip emitters, for example), amount of water to be added, and the possibility of using saline water for irrigation Sub-irrigation with leaky pipes was used to reduce salt accumulation (better leaching) and to overcome problems at the site with poor infiltration of surface water because of compaction Placing a layer of straw underneath the trees also improved soil characteristics because water infiltration was better, which improved salt leaching and drainage

Several pruning and trellising systems were studied with 'Thompson Seedless' and 'Flame Seedless' table grapes Concentrations of the

plant hormone dormex at 1%, 2%, and 3% percent were compared for their ability to induce flowering and enhance fruit set in grapes Similar experiments with this hormone are being conducted on apricot and persimmon Two new grape cultivars, Red Globe and Fancy,' are being studied

By providing additional nitrogen to prickly pears (*Opuntia* cv Ofer) after the August fruit picking, a second winter crop could be harvested In terms of yield and tolerance to high salinity and pH, the best almond cultivars were 'Um El Fahm,' Ne Plus Ultra, and 'M D 4 ' Raised beds should be used when fruit trees are planted on heavy calcareous soil to improve drainage 'Khashabi' performed the best of the apple rootstocks tested Others tested were 'Anna,' 'S Adena, and 'MM1 ' Over 60 mango cultivars were sent from Ramat Negev to Maryut for trial The propagation nursery has been expanded to include new almond, plum, and peach varieties with better salt tolerance Over 200 nematode-resistant peach and almond rootstocks were imported Propagation of these rootstocks using rooting hormones and chilling resulted in a 70% success rate

A fruit tree nursery has been established to propagate the most promising cultivars Thousands of fruit tree seedlings and other plant materials have been distributed to some 65 farms in an area stretching from Alexandria to the outskirts of Cairo Outreach activities are being initiated with selected growers to test new varieties under their cultural practices Early, mid-season, and late cultivars are being evaluated for their potential to extend the harvest season and to correspond to periods of high demand in export or local markets Chilling requirements, use of dormancy breakers, grafting interactions, and effects girdling or drought on time of flowering, maturity, and quality aspects of the fruit have been evaluated

Ramat Negev Site, Israel

Thompson seedless grapes produced under saline irrigation were smaller, but soluble solids were elevated Wine grapes were included as crops to be investigated at the station because of the potential for flavor enhancement through saline water irrigation and because the growing conditions (low humidity, cool nights) were also felt to be favorable for production of a high quality wine The potential to mechanize training and harvest would also contribute to the favorable economics As a preliminary study, eight rootstocks were grown under three levels of saline water irrigation A line source design with a gradient range of 2 5 to 6 5 dS/m in the irrigation water was used to provide varying salinity levels Rootstock performance was assessed using pruning weight as a measure of vigor In August 1993, the cultivar 'Cabernet Sauvignon,' a high quality red wine grape was planted on the rootstocks 140 Ruggieri' and Salt Creek ' Grapes were

grown at salinity levels of 1 2, 2 7, and 4 2 dS/m in a randomized complete block design using the line source design system Enology studies will be held in collaboration with staff at the Wine Research Institute

Olives given saline irrigation had 24% more oil content, but overall yields were lower It was felt, however, that increasing plant density under saline irrigation could compensate for yield reduction Early apricots are also considered to be a promising crop for the area Performance on the rootstocks, 'Mishmish clabi' and 'Mishmish Ranana' was compared under the salinity gradient described above for wine grapes In the more resistant rootstock, a major band at 66kd was detected using SDS PAGE analysis of the rootstock buds and bark The concentration of this protein was also higher in the saline-grown plants Further studies are underway to determine the value of these proteins as markers for salinity tolerance

K. Post-harvest Handling

Maryut Site, Egypt

Post-harvest characteristics of a number of cultivars of cucumbers, peppers, tomatoes, zucchini and fruit trees were evaluated to identify those with good shelf-life characteristics under local conditions Post-harvest characteristics of broccoli were examined particularly carefully because of the crop s sensitivity to ethylene and its short post-harvest life without cooling Pilot studies on several cut flower species have been initiated to examine effects of temperature, water relations, sugars and other additions on shelf life Simulations of export conditions on the post-harvest behavior of tree fruits are also being developed

A post-harvest treatment center was to have been completed by January 1995, and was said to be almost ready When completed, it will measure 1,200 ft^2, and consist of four rooms containing equipment for cleaning, sorting, and packing fruits and vegetables In the future, cooling facilities will be added to the center for both the post-harvest requirements of the station as well as to provide training and extension for local farmers As an example of such a training session already conducted lettuce was stored at different temperatures and with different packaging and the results observed by area farmers

Ramat Negev Site, Israel

Post-harvest in terms of quality and shelf-life is an integral component of all projects since the export market is targeted There were no experiments reported specifically on post-harvest concerns, however Presumably this is because post-harvest characteristics of the crop being investigated are already well-described

IV. PROJECT MANAGEMENT

A. Management by U S Institution

Administrative coordination between the United States, Egyptian, and Israeli sub-contractors has worked effectively The SDSUF has a good working relationship with institutions in both countries SDSUF maintains good communication between parties regarding equipment purchases, convening of meetings, and trouble shooting, and has been available to address problems when needed Arrangements for visitors to Israel from Egypt and the reverse were difficult early in the project, but have been managed well and without significant problems or embarrassing incidents Technical Committee reports documented problems in ordering necessary materials for example work was being held up because computers had not been ordered The site manager told of early problems in tracking purchase requests but indicated, to the credit of all involved, that the problem was solved and the process was now working fine The coordination of the subcontractors and the management of the Technical and Steering Committees has, for the most part, worked well

Status of Required Reports The annual and semi-annual reports submitted to USAID appear to be complete in reporting personnel changes travel, meetings and collaborative activities procurement and publication and intellectual property rights In terms of reporting progress in meeting technical goals and work plan objectives, the reports lack substantive information Progress statements such as "data from the previous season is being analyzed" or "research is being conducted on a variety of crops are typical of reports reviewed Country coordinators do not consider technical reporting a high priority, and the U S project coordinator often prepares reports without adequate data from country programs The SDSUF needs to improve its reporting of technical progress Each investigator for example could be required to supply an annual report of progress that would allow tracking of progress toward their specific research goals

Participant Peer Review of Project Work The internal peer review, called for in the project proposal, was to be conducted at approximately 12-month intervals by prominent scientists from Egypt, Israel, and the U S In 1994, an internal evaluation was conducted by members of the Technical Committee Dr Richard Jones conducted a comprehensive review of the project in September, 1993 The peer reviews have been comprehensive and some recommendations implemented

Fund Flow to Principal Investigators Scientists benefited by the project funded visits to Israel and Egypt, training or working in the U S with a scientist counterpart, travel to professional meetings,

equipment upgrading and support of their individual research activities

Egypt Funding for direct research expenses is provided on the request of the scientist to the Program Director, followed by the approval of the Country Coordinator Support funding is flowing to scientists in a timely manner as appropriately needed, except as noted above

Israel. The Israeli Country Coordinator is running a targeted, small grants research program with Maryut II funds Scientists are assigned a budget number in the accounting office of Ben Gurion University, thus knowing their funding for the year Six scientists, other than the Country Coordinator, received life-of-contract funding ranging from $11,300 to $92,500 Project members have access to funds, and the Country Coordinator provides supervision and evaluation of each member's work The funding supports work within the targeted area with appropriate supervision and direction of expenditures to promote project goals

B. Role of the Steering Committee

The Steering Committee provides policy direction to the Maryut II project The committee consists of nine members, three from each country The stature and position positions of Steering Committee members from Israel and Egypt enable them to resolve potential political problems and keep the project on track Steering Committee Members and Country Coordinators have maintained project stability When problems occur, they take rapid action to solve them The Committee also plays an important role in seeing that project direction is maintained and provides modification when conditions warrant The Steering Committee plays a role in insuring that recommendations of the Technical Committee are implemented, although at times they have not carried out Technical Committee recommendations (nor have they provided reasons for not carrying them out as documented in the Maryut Technical and Steering Committee materials provided to the Evaluation Team)

C. Overseeing Activity of USAID Program Office

For MERC, unlike programs operated out of a country Mission, USAID hasn t been able to provide on-site supervision MERC projects stand alone in the field because they involve more than one country They should have some on-site overseeing activity by USAID Washington to keep them on track and to direct mid-course adjustments in project when necessary In this project, the presence of on-site MERC project personnel might have led to a change in direction enabling more genuine collaboration between Egyptian and Israeli, especially in the

area of outreach USAID might also take responsibility for coordinating evaluations because access to programs and information by evaluation teams may be controlled by the contractor, thus preventing a clear picture of the overall progress and direction of the project MERC projects could be monitored as follows

1 **On-site Supervision from Washington, D C** If project office personnel made regular inspection trips, the direction of each project could be monitored and changes in direction implemented more easily The presence of a project officer could help solve problems and facilitate changes in direction as needed
2 **Supervision by USAID Country Mission or Embassy Personnel:** Because of the multi-country nature of MERC projects, this will not be possible in some situations Embassy personnel may not be qualified for supervision of technical projects and USAID Mission personnel (as well as Embassy personnel) may have full portfolios, thus be unable to spare time for additional duties Embassy and USAID Mission personnel, when possible, contribute to the success of MERC projects by their interest and observations and could provide useful assistance for evaluation teams Monitoring of in-country progress (by both Mission and Embassy) is helpful for overall evaluation and especially useful when MERC projects support Mission priorities
3 **MERC Project Officer or Representative Stationed in the Middle East** This is a possible alternative but the added cost of placing a person in the field is quite high and may not be justified If the number of projects increases, this might be a viable alternative Assignment of an Embassy or USAID Mission person part-time to MERC is a possible alternative

The on-site monitoring of MERC projects by USAID Washington would be a useful addition to MERC projects and would help insure that projects are meeting the overall program objectives The utilization of a contractor to provide technical and management help, including on-site visits is a positive step but may not eliminate the need for USAID MERC personnel to have at least some on-site monitoring

V. COOPERATION BETWEEN INSTITUTIONS AND COUNTRIES

A Cooperation and Sustainability

The Maryut II project was structured so scientists from both Egypt and Israel could work together to resolve research problems on an on-going basis The project emphasized work on applied research, development, and dissemination A site in Egypt was secured for the collaborative research work, and a technical advisor from Israel lived on site for the first 2 years of the project

The evaluation team questioned participant scientists and administrators, both individually and in groups, concerning collaboration and cooperation within the Maryut II project In the Maryut II Project, there is some direct collaboration between participating scientists of the project because the Technical Committee consists of all Maryut II scientists Many plant materials have been exchanged and counterparts are working to develop the Maryut site Work in Israel, mainly done in the Desert Station at Ramat Negev, supports ornamentals, native plants for environmental gardening, and other related work

Many of the participating scientists from both countries indicated a preference for one-on-one work with a counterpart scientist rather than working in parallel Israeli scientists expressed the concern that they "would like collaborators not visitors " The notion of instituting short term exchanges of scientists was enthusiastically embraced by the participants The overall sense was that such a mechanism would provide a basis of equal ownership of the project between both Israel and Egypt It was agreed that, in the beginning, the use of an Israeli technical advisor on site was helpful As the project matured, however, it became apparent that the strategy of providing technical expertise from only one side of the tri-lateral project was not working The project participants, to their credit, addressed this issue by removing the on-site technical advisor earlier than had previously been planned

It was suggested by one Israeli scientist that conducting the same research at sites in both Israel and Egypt would be a good way of replicating the results and, in fact, would validate the methodologies being tested Unfortunately, the highly calcitic site chosen for the Maryut II work in Egypt does not resemble the soil or water conditions at the experimental site used in Israel (Ramat Negev) An additional difference between the projects is that Israeli research targets the export market much more directly than does the Egyptian research and is much more narrowly focused The evaluation team learned from scientists involved in Maryut II that the scientific research priorities concerning protected agriculture in Israel and Egypt were different, making direct collaboration on some research activities difficult There was a sense from some scientists involved that conducting truly collaborative research between Israeli and Egyptian scientists would be an exciting prospect, however for that to occur it would be necessary to identify define, and focus on research issues common to both countries It became apparent to the evaluation team that a perceived hindrance to the collaborative process was a focus on individual country priorities and national self-interest, shared by both Israeli and Egyptian scientists Israeli scientists readily indicated that they would not be able to work on exclusively Egyptian research issues, research

had to result in some direct benefit to Israel This reliance on national self-interest to determine research priorities in some ways hampered attempts at direct collaboration Even with the stated differences in research priorities, many areas of collaborative activity are possible and should be pursued For example, fruit tree work involving both Egyptian and Israeli scientists, is moving ahead well

The Egyptian scientists emphasized the need to structure projects to achieve an equal partnership between collaborating scientists exists Projects that involve a disproportionate transfer of information (for example, technology being provided in only one direction) were felt to fall short of project expectations Egyptian scientists very clearly expressed their notion of the importance of U S scientist participation in continuation of the project They perceived U S scientists as both mediator and facilitator of the international networking necessary for project success They generally preferred to work in the U S In some ways this is logical because the diversity of scientific expertise in the U S makes it easier to identify appropriate research programs Language is also less of a problem in U S universities However, in the future, as working linkages develop between Egypt and Israel, there may be a reduced role for U S scientist participation

An important aspect of the Maryut II project was that it brought new scientists many of whom were quite junior, into the process of research and international collaboration Several key institutions from each country participated in the project, as well, and this institutional collaboration also appeared to be valuable

B Scientist Involvement

Participation of scientists has been very good 9 from Israel, 25 from Egypt, and the 3 from the U S It was especially pleasing to see the large number of young, enthusiastic scientists taking part in the project In addition to Steering and Technical Committee meetings, many Egyptians have been to Israel on work/study tours and, likewise, many Israeli s have been to Egypt Six Egyptians, four Israelis and one U S scientists traveled to a Conference in Mexico City Many examples of benefits from international travel were cited by participants to illustrate the value of the project to both countries Germplasm provided by Israel (although not necessarily of Israeli origin) was used on the Maryut site Examples of technology flow to Israel are exemplified by the December 1993 visit of two Israeli scientists to the Maryut site to evaluate desert housing with the intention of applying the technology to the Negev region Likewise, two Israeli scientists, on the same trip, looked at mushroom production with the idea of utilizing the technology in Israel (for a detailed

breakdown of travel, see Appendix E) The following table summarizes attendance at Technical Committee Meetings

Number of Participants Attending Maryut II Technical Committee Meetings by Country of Origin

Country of origin	1992 Meeting in Egypt	First 1993 Meeting in Egypt	Second 1993 Meeting in Egypt & in Israel	1994 Meeting Israel and Egypt
Egypt	7	12	9	15
Israel	6	0	6	7
USA	3	2	3	3

C. Sustainability of Activities

Scientists and country administrators were asked whether or the scientific relationships (developed as a result of the Maryut II project) would continue after project completion There was general agreement that continuation of these relationships would be possible, especially given the applied nature of this project Scientists indicated that since Maryut II had been developed to focus on mutually applied research issues, the impetus for continued collaborative work was built into the project With more issues in common, there is more reason to continue to work in a collaborative manner In addition, the evaluation team has learned that several of the Egyptian and Israeli scientists involved in this project are meeting to draft additional research funding proposals However, at the completion of the project, the number of face-to-face meetings between the Egyptian and Israeli scientists is likely to decline, because MERC travel funding has been required to finance site visits and the gathering of all the scientists at the technical committee meetings (especially true for Egyptians)

The Egyptians strongly believe that the participation of U S scientists is vital to the continuation of collaborative efforts with Israel U S counterparts act as both mediators and as networking facilitators The Egyptians readily emphasized that the critical role of the U S extended well beyond that of financial contributor to the success of the Maryut II project

Scientists and administrators from both countries indicated that at project termination, research in protected agriculture would continue though at a reduced level in Egypt In terms of individual research sites, there is ample evidence from domestic spending patterns and other donor activity that sites will be maintained and will continue to function in a productive way, although, services to small farmers may decrease or move to a fee-paying basis Some of the Egyptian sites may be used for income generation

The Egyptian Maryut II site has been purchased for the Agricultural Research Center (ARC), thus, maintenance of the site for research purposes is a high priority of the Egyptian government

The Maryut II project appears to be on track in terms of accomplishing its stated goals but a greater focus and increased development of materials for the farmer would increase the payback during the life of the project It also has a built in sustainability component in that the research issues have more potential for commonality than did previous projects, and the research sites have been assigned to conduct the research identified in this project

D Co-authored Papers Differentiation Between Collaborative and Parallel Research

There were no co-authored papers between scientists of the two countries Scientists from Egypt, Israel, and the U S are, however, working together to provide plant materials and planning for the development of the Maryut site In certain areas, such as fruit crops, a close collaborative relationship exists between the Egyptian and Israeli research partners This close collaboration may account for the success of the fruit crop program We were told that Maryut has the largest fruit tree collection in the Middle East In other areas, such as ornamentals and vegetables, there was less evidence of direct cooperation and information sharing In the case of research on ornamentals, this was attributed to personnel turnover at Maryut The situation may improve now that a new investigator has been assigned to the ornamentals area With the exception of the fruit tree work, collaboration (between Israel and Egyptian scientists) on a one-on-one basis is minimal Most research is carried out in a parallel fashion with some sharing of information at Technical Committee meetings

VI. ADDITIONAL FINDINGS AND CONCLUSIONS

A. Value of Internal Evaluations as a Management Tool

Internal evaluations have been very helpful to the project Evaluations have been thorough and constructive and their recommendations have been carried out in some but not all cases The Steering Committee may need to involve itself more directly in implementing Technical Committee recommendations Some recommendations made by the Technical Committee (scientists working as a committee of the whole) have received no response from the Steering Committee The recommendations, therefore were not followed The Steering Committee, and the Project Director need to communicate to the Technical Committee, what their action has been on Technical Committee recommendations

B Contributions of U S Scientists Serving on SDSUF-MERC Project Committees

Eleven U S scientists serve on the three MERC Projects (CALAR II, Maryut II, Morocco) related to protected agriculture Egyptian scientists especially appreciated the opportunity to interact with American scientists and to work in American laboratories American scientists often serve as the "middle ground" in providing direction to projects, and their role was contributive to project success

Three of the U S scientists serve on more than one project and two of them have made major contributions (beyond the annual meeting participation) The team feels that having committee members serve on more than one project may sometimes reduce the originality of projects, but that liability is more than offset by savings in travel to the area, which is coordinated between projects, and by the opportunity for committee members' to increase their familiarity with the region

The U S scientists have all played a contributive role, but reducing the numbers of U S scientists, while increasing the activity of those remaining, may be desirable Many scientists attended the workshops but took little part in guiding the project Scientists who advise projects should be selected for their expertise, interest, and willingness to provide continuous service

C. Value of Steering and Technical Committees as Compared with a One-Committee System

The Steering Committee, as described earlier, serves to establish policy direction and facilitate operations, especially when problems occur The Israel and Egypt Country Directors are in continuous contact and keep the project on track The Technical Consultant Panel called for in the project proposal has been given the name Technical Committee This means of operation served well in the original Maryut Project Three U S scientists participate, two of them on a continuous basis The Technical Committee (all scientists serving as a committee of the whole) meets as needed, generally once each year (twice in 1993) The first two meetings were in Egypt because of the startup work there but the last two meetings have included meetings in both Egypt and Israel The scientists meet in commodity groups (fruit trees, vegetables ornamentals etc) and evaluate the previous year s progress They then make recommendations for the following year The scientists meet, with one of the country coordinators presiding, and submit their recommendations by commodity group Written recommendations are provided to the Steering Committee by the Country Coordinators following the meeting The system works very well, provides a good yearly input into the next year's work plan, and should continue intact This is an excellent example of true collaboration and provides

direction for the programs based on joint input from all parties, working together to promote the best interests of the program Greater follow-up may, however, be required to see that the Technical Committee's recommendations are implemented In the Committee notes, several examples were given where the previous year s recommendations had not been followed, and a need for greater pre-season planning and coordination of activities was indicated Nine members of the Steering Committee (Coordinator plus two members) may be more than are needed for effective operation It appears that conditions between Israel and Egypt at this time are much better and the size of the Steering Committee (especially the U S component) could be reduced It seems advisable for the project scientists (Technical Committee) to meet at least annually A system of combining meetings and allowing direct input of the Technical Committee into a smaller Steering Group might be worth considering Both Technical and Steering Committees should, for the most part, meet on project sites Future projects should consider having one committee with technical membership as needed to provide technical guidance rather than the two committee structure (plus a mechanism to solicit input from scientists as needed)

D Target Farmers' Access to the Technology

Maryut technicians provide technical information to many groups of graduates and other agriculturists Plans call for graduates to be given information about alternatives for cropping, provided examples of model structures (for example a low-cost greenhouse for growing seedlings for sale) and assisted with their planning When the graduates are ready to start production, the project hopes to place graduates in touch with a buyer to help them plan marketing strategies In some cases, buyers may provide some cropping inputs, the Project provides the technical backstopping, and the graduate does the work of raising the plants Technical training short-courses are held on the site, and in the near future, soil, plant materials, and water testing will be provided for a nominal fee Some brochures have been prepared based on work at the project The Team was shown a tomato production guide in Arabic, as an example of dissemination of information from this project It was not clear, however, how many of these guides have been prepared or if the Maryut personnel or Ministry of Agriculture personnel will be involved in the actual writing and dissemination of future material Procedures for systematically reaching resettlement farmers do not yet appear to be in place

E Target Farmers' Access to Inputs

Maryut II scientists do consulting work for large, commercial farms that have access to all needed inputs The smaller resettlement farmers are often short on cash and lack the resources needed to begin profitable farming Thus they are unable to fully utilize the production technologies that Maryut II scientists promote Maryut II staff are helping by placing farmers in contact with buyers who provide some inputs, mainly seeds and fertilizers With Maryut technical help, buyers are more willing to provide production inputs In order to enjoy economy of scale, Maryut staff have helped some resettlement farmers pool their resources as cooperatives to strengthen their marketing and purchasing ability The Maryut staff tries to be aware of the market situation and steer farmers toward endeavors with the best chance of success

F Type of Farmers Benefitting From the Technology

The team visited small farms of resettlement graduates who were utilizing plant materials from the project and had received technical assistance from project personnel Two medium-sized farmers were visited who were also using project materials and services Scientists are allowed to consult for 1 day each 2 weeks and through this avenue they have an impact on large farm operations Some are also involved in projects sponsored by other donor nations or companies (Japan, Germany, Denmark) targeting small farmers

G Evidence That Research Generated in One Country is Being Transferred to the Other

The scientists in Maryut II work cooperatively with some true collaboration Because of the groupings within the Technical Committee, Israeli and Egyptian scientists working on similar research areas are likely to communicate ideas and technologies Sharing of plant materials has contributed to the success of the Maryut Center For example, over 60 mango cultivars, brought from Israel, but originating in many parts of the world, are grown there Potentially both countries benefit from the research of the center, however, the direct benefit to date has been to Egypt Post-harvest handling, ornamental and decorative plants, and introduction of new cultivars are examples of technologies potentially benefiting both countries Attempts to identify local markets with materials introduced from the other country have been tried as a result of the program (fennel, for example) Evidence of cooperation is provided by the following examples (some may overlap with CALAR II project)

- 'Williams' banana was introduced from Israel and is being grown in Egypt, both at Maryut and on private farms
- Landscape plants have been exchanged (Israel to Egypt)
- A number of almonds (some U S varieties) have been introduced from Israel to Egypt
- Numerous examples of genetic materials have been transferred from Israel to Egypt
- Egypt has received over 60 mango varieties (U S varieties) from Israel
- 'Anna' apples and 'Galia' melons have been introduced from Israel to Egypt
- Methods of managing salinity exchanged between scientists
- At the annual Technical Committee meetings, and on individual or group tours, many exchanges of information were reported to have occurred, which benefited scientists from both countries Both Israeli and Egyptian scientists also reported many gains of information and materials from the American scientists involved
- Several scientists are working together on a somewhat regular basis to improve the research and availability of good plant material Although difficult to measure the project created a strengthened respect between scientists of Egypt and Israel

H. Status of Project Sites After the Project Ends

Work sites will be maintained in both countries In Israel, sites will function well with or without Maryut II project assistance In Egypt, the Ministry of Agriculture has recently taken steps to acquire the Maryut II site With government ownership, there is no reason why work can t continue, but the Technical and Steering committees should still address project sustainability immediately They should take into account the fund-raising components available to them (plant materials sales, soil, water, and plant analysis, etc) and generate a plan that will provide for sustainability The plan should take into account the support of the government, income support, and a reduced level of outside donor assistance For the Maryut site to truly reach its potential and become self-sustaining, the organized extension and marketing components should receive greater attention than they have to date and be developed on a fast-track while full project funding is still available

I Environmental Degradation, If Any, Caused as a Result of the Project

The issue of management practices to reduce environmental degradation is being by Maryut scientists from both countries Many experiments targeted techniques such as breeding resistant crops to

minimize use of pesticides and using organic manures instead of chemical fertilizers When implemented, these techniques will reduce detrimental effects of greenhouse production on the environment On the negative side is the reality that expansion of "protected agriculture" will increase the amount of land converted from desert to intense cultivation, thus causing environmental degradation of desert lands Most water for irrigation comes from the Nile, and the reflow of irrigation water back to the Nile will lower water quality by adding salts, pesticides, and fertilizer to the flow On the other hand, it should be noted that the work at the Maryut site is directed primarily at the similar soils in the next phase of development in the far western desert near the Mediterranean coast, and that these lands drain mostly toward the coast and Lake Maryut or the Qattara Depression rather than placing an additional burden on the Nile Delta According to the Egyptian scientists, the subsurface aquifer in these regions flows north toward the sea Other countries have policies that will place desert lands in production so the Maryut II project, within this framework, can be considered to have somewhat moderated the detrimental effects on the environment As discussed next, water-use efficiency and land-use efficiency is higher in protected agriculture than in open-field agriculture, which would be the agricultural alternative

J The Future of Protected Agriculture in the Middle East

Growth patterns in both Israel and Egypt suggest that protected agriculture will have an increasing role in future Protected cultivation in both Israel and Egypt is expanding (up to 10% per year), and there is no evidence that this trend will change Both governments are committed to placing more land in intensive production The increased water-use efficiency and the possibility of off-season production are the major advantages of this type of agriculture Also where individual growers have only small land holdings (such as the 5 feddans provided to university graduates in Egypt), they can be economically sustainable when high-value crops are grown under plastic There may be a point however, where declining profitability places a limitation on the area being used For example tomato growers using low plastic tunnels in Egypt now derive a price advantage from early production If however a significant conversion to tomato production in plastic tunnels occurs the early market will be flooded and prices will fall too low to support the extra cost and labor required to use the tunnels Thus crop diversification and attention to marketing is an important component

K Women in Agriculture

Five Egyptian women (engineers or technicians) are serving on the Maryut project None of the Ph D level scientists in Egypt are women, however The technicians are well qualified for their work, serve in key technical areas, and are contributing substantially to the project In addition, one Israeli woman scientist serves on the Maryut Steering Committee, and another Israeli woman serves as a scientist (principal investigator) on the Maryut project

L Model Farms and Economic Information

The original Maryut II proposal called for establishing three model farms Although the project is not establishing model farms at this time, there are plans to make enterprise information available on individual crops Instead of model farms, the current program plan is to provide inputs for different enterprises (almonds, grapes, and tomatoes for example) and to provide information on the current cost of inputs, expected yield, and anticipated market value to resettlement farmers who then can make their own decisions Maryut personnel put farmers in contact with the buyers who often provide the inputs needed for production (important for those with limited capital) The procedure should be effective and model farms should not be a priority at this time (perhaps throughout the project) Conceptually, the site Director considers the whole Maryut operation to be a model farm, and this is somewhat justified by the diversity of crops grown and enterprises attempted

VII. SUMMARY OF EXTENSION ACTIVITIES

The project is now providing two types of outreach activity training/technical support and plant materials At least 12 new graduate farmer village sites have received plant materials Apples, grapes, almonds, peaches, figs, and other plant materials are among those distributed Distributions were made in both 1993 and 1994 In addition, seedlings of many crops, such as tomatoes and melons have been distributed When materials are distributed, technical assistance is also offered and generally accepted by the farmers Visits to the farm have been increasing, and in 1994, 16 groups including African and other foreign students, university groups, and others visited the site Ten groups of new graduates (averaging 30 students per group) were provided short courses, usually 1 week in length, in 1994 On and off-site extension work should expand now that classroom facilities and a soil/water/plant tissue testing laboratory are available

The value of the site for serving resettlement farmers can be partly measured by the numbers of plant materials and seedlings distributed

and the numbers of farmers receiving technical assistance The other component of value is the quality of this technical assistance Therefore farmers should be targeted and tracked so that the success of these farmers could be measured over time and compared with the success of a control group not in contact with the project personnel or compared with the farmers' progress before receiving assistance

A. Outreach and Extension Strategy

The Maryut site is now a showcase and has all the components to be an effective generator of technology to targeted resettlement farmers The value of the site should not be measured on looks and on-site technologies, but rather on how well it serves the resettlement farmers of the region Although many groups will come to the center for tours and short courses, it is going to take a well-directed, targeted program to reach the resettlement farmers The center has made contact with a number of resettlement sites and, according to information given to us, sold plant materials to many of them (12 sites listed on one chart) Future evaluations should be able to select random farmers from a list of cooperators and, by interviews and farm visits, measure the impact of the center on their farming operation (materials distributed, extension training given, record keeping, presence of buyers) The center should develop a systematic outreach program to deliver information and materials from the center to the resettlement farmers The Director eloquently outlined a procedure for reaching target resettlement farmers and helping with their operation His procedure consisted of the following

1 Identifying farmers and providing them with economic alternatives (pricing of inputs, expected outputs, market alternatives)
2 Putting the resettlement farmers in touch with a "buyer" who will, in many cases, provide inputs until time of produce sales
3 Provide targeted farmers, through center personnel and identified MALR extension personnel, the technical know-how needed to produce the crop

The Director's ideas appear feasible and the program should be implemented The process should begin immediately The following strategy is suggested

1 Select 20 resettlement villages (using the 12 already identified that have plant materials from the center) With a representative from each of these resettlement villages, establish a Management/Advisory Committee to provide guidance for the center Such an advisory committee could provide input on needs of villages as well as serving to channel plant materials, technical services, and information from the Maryut station to farmers

2 Target 10 farmers within each resettlement village to follow for an extended time to determine their success as a result of the technical assistance received Efforts with these farmers should include a simple record-keeping system to assist with tracking of progress
3 Provide assistance to each village (group schools, special courses, etc) but concentrate assistance on the 10 selected "target farmers" (20 sites × 10 farmers = 200 farmers) The 10 farmers should be contacted by station personnel at least every other month through group or individual meetings
4 Provide marketing assistance to the selected villages by producing printed materials listing alternatives, by offering simple marketing courses, and by putting buyers in contact with farmers

The experience gained through working with these resettlement farmer groups could serve as a background for forming producer groups that would work with the center and provide support for services (marketing services soil/plant testing, technical support, etc) on a fee basis A small percentage of produce sales proceeds might be the basis for supporting the core organization that provides the services to a select group of resettlement farmers The resettlement farmers being college graduates, offer an intelligent and capable group to work and interact with—in many respects an unusual group because of their educational level

B Marketing Assistance

The Maryut R & D Center is equipped to offer a wide variety of technical assistance and plant materials One missing component is marketing expertise An economic study has been prepared but is not being utilized (and may be of little value for meeting the current need) The center needs to employ an expert, knowledgeable in both export and local markets to be on the team serving these resettlement farmers Without such expertise, the chances for success with resettlement farmers (or any beginning farmers) is minimal Collective marketing action offers significant advantages to farmers (especially to small farmers) and the Maryut Center can be a leader in helping these farmers be successful) Two steps should be kept in mind in meeting long-range goals with these farmers

1 They should be provided extension marketing and management training and technical assistance to help them operate farmer directed, profit-oriented businesses
2 Consideration should be given to using a method of helping capitalize innovative marketing cooperatives with funds collected, as a percentage of sales Such proceeds could support continued technical and marketing assistance to farmers

The above model is only a sample approach to helping the resettlement farmers move toward a goal of profitability If this model isn't accepted, however, a substitute model should be quickly developed and implemented In any model, the presence of a "marketing expert" with considerable practical experience, is vital Current efforts to "check out the markets in Alexandria," while commendable will not necessarily lead to the type of long-range planning and targeting of efforts necessary for project success

C. Cooperation with Other Programs

During its visit, the team observed many donor programs serving the resettlement farmers but little coordination When possible, programs should be coordinated to complement the activity of all programs and especially to benefit the resettlement farmers One village visited had a [illegible] French government-supported program that was providing help to resettlement farmers This program was also working with the Maryut Center (a desirable situation)

The Maryut II project is struggling to provide meaningful training to resettlement farmers and middle-level extension personnel Meanwhile, the Government of Israel, in cooperation with the Government of Denmark, has a training program working with resettlement farmers and middle echelons of scientists and extension personnel There are two components a training program in Israel and mobile (on-the-spot) courses offered in Egypt The major goal of MERC projects is to bring about cooperation and understanding between Egyptian and Israeli scientists and technicians Cooperation between these two projects would offer an excellent chance for Israelis and Egyptians to work together and to collectively meet the needs of a targeted group (the resettlement farmers) Israeli experts chosen for participation in this program are, as far as possible, conversant in Arabic The Israeli/Danish program could complement the Maryut Outreach program (and vice-versa) in the following ways

- **In-Israel Courses:** Farmers selected in each of the 20 resettlement villages could be candidates for courses in Israel (university graduate training courses farm managers' professional tour, and workshops) Courses in vegetable and fruit production and irrigation and "fertigation" would be especially useful The possibility of an Egyptian scientist from Maryut accompanying the group to Israel to coordinate and possibly help with instruction might be advantageous (this depends, on agreement with MASHAV and CINADCO)
- **In-Egypt Courses** Participants taking a course in Israel are often able to help obtain participants for a "mobile (in-Egypt) course "

This possibility, accompanied by close collaboration with the Director of the Maryut Center could be the means of putting together such courses Selection of instructions is the responsibility of those in charge of the Israeli/Egyptian joint program, but it is highly recommended that some of the excellent scientists of Maryut be involved in the planning and delivery of the courses In this manner, two important jobs would be done—that is, close collaboration by working together and transfer of needed technical information

The complementary effect of using resources of both programs to serve resettlement farmers appears an excellent possibility if the working relationships can be arranged Both the relevant parties on the Egyptian scene (GARPAD and the MALR) and the parties of the current tri-national agreement (MERC) should express their clear interest and support to the suggested cooperation

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The project is operating on-schedule and meeting objectives in the time frames called for in the proposal The resettlement farmers are receiving technical help, plant materials, and services that can help their operation succeed Specific conclusions follow

1 The project is meeting its sub-project technical objectives Scientists from the three countries are working together to establish the Maryut II site as a research and demonstration farm and training center To this end, continuing attention to developing "packages of information is desirable At this point, it may be better to package information now available than to focus on generating more information
2 SDSUF and the Egyptian and Israeli subcontractors are doing a good job of meeting the major objectives of the project The Technical Committee (committee of all scientists) is continually reviewing progress and making corrections when necessary Greater attention needs to be paid by the Steering Committee to see that these are implemented
3 Significant cooperation and some collaboration exists between the U S , Israeli, and Egyptian scientists working together to meet the demands of the project Israeli research, while focused on Israeli agricultural priorities, contributes in a general sense to Egyptian needs, and researchers are available to consult on specifically Egyptian research questions Egyptian work, conducted in a collaborative mode, serves the needs of the New Lands farmers

4 Scientists of the project are aware of the environmental concerns of the region, and they are developing recommendations and management methods to ameliorate or, it is hoped, prevent future problems Special attention must continue to be given to preventing salinization problems, both on the station and in the new lands While the technical expertise certainly exists within the project and within the Egyptian administrative infrastructure to prevent salinization, it will also require a continuing commitment by all concerned, including coordination with irrigation authorities in the New Lands Project, to achieve long-term regional sustainability

5 Protected agriculture will continue to expand in the Western Desert of Egypt The development work of the Maryut II Project will help farmers develop sustainable operational and management procedures for financial success and environmental protection

6 Women are serving in key roles in the project, although no female Egyptian Ph D s are involved

7 Other projects serving resettlement farmers could complement the work of the Maryut Center

8 The project lacks the services of an expert in domestic and export marketing

9 Although the project site has much to offer resettlement farmers, an organized and effective outreach program is not present

10 The research/demonstration enterprises on the station should be prioritized, reduced in numbers, and more closely focused on specific opportunities for resettlement farmers

11 It was difficult to distinguish between work that had taken place work underway, and work that was only in the planning stage Raw data provided was not easy to summarize, and summaries, if provided at all in written form, were not detailed enough to analyze Thus it is difficult to evaluate the exact scope or quality of the work that has taken place Relatively few statistics were provided to verify success in terms of reaching specific goals

B Recommendations as a Result of the Evaluation

Everyone associated with the project especially the scientists and technicians should be pleased with the progress to date Major changes of direction are not called for but the extension and marketing efforts of the project need to be intensified

1 The extension/outreach activities should be expanded to reach more resettlement farmers Increased efforts to train MA extension personnel should be a target of the project The "train the trainers" approach will enable a better distribution of the materials and services of the project

2 The station should focus on fewer enterprises and concentrate on developing those of greatest potential to resettlement farmers
3 The Egyptian expert staff of Maryut should include a specialist in marketing to assist with the marketing of products for farmers served by the site
4 In identifying cropping systems, the Center should focus on fewer systems and develop them well This would simplify the packaging of materials and information for the resettlement farmers
5 The complementary effect of using resources of the Israeli/Denmark program to serve resettlement farmers appears an excellent possibility for enhancing training of resettlement farmers and mid-echelon extension personnel Both the relevant parties on the Egyptian scene (GARPAD and the MALR) and the parties of the current tri-national agreement (MERC) should express their clear interest in and support for this cooperation
6 The success of the technical program will be determined by the numbers of plant materials (germplasm) developed, numbers of materials screened and the numbers of resettlement farmers provided technical assistance The next evaluation should include interviews with resettlement farmers in the region (for example, in a 40 km radius) to determine the success in this work Farmers not influenced by Maryut but working in similar areas, would be a good comparison group The outreach strategy proposed in this report should provide a list of resettlement farmer cooperators from which the next evaluation team can select
7 The Maryut II project should maintain linkage with USAID-Cairo to take advantage of the newly planned horticulture marketing program
8 The technical committee minutes stated several times that 'again, specific action should be taken ' All recommendations of the Technical Committee may not be necessarily good however, a follow-up action (accept or reject) procedure needs to be put in place and followed
9 Instead of the two-committee structure, future projects should consider having one committee with technical membership as needed to provide technical guidance (plus a mechanism to solicit input from scientists as needed)
10 Since increased collaboration between scientists of the two countries is a major output of the project, the contractor and sub-contractor should identify technical areas of collaboration and provide for extended scientist exchanges (reciprocal visits of Egyptians to Israel and Israelis to Egypt) While several Egyptian and Israeli scientists have been able to identify and work with specific counterparts from the other nation as a result of this site-

directed project, much of the research is still conducted in parallel in accordance with each nation's priorities

11 The technical reporting on the annual and semi-annual reports needs to be improved with more explicit experimental design and technical results cited Each investigator should be required to supply an annual report to allow tracking of progress toward technical research goals

12 The Maryut II team needs to remain aware of the importance of salinity and give the utmost attention and priority to preventing irrigation mismanagement They should also be aware of the environmental priorities of both MALR and the Water Resources Board

13 The soil mapping and fruit crops programs stand out in terms of both technical achievements and potential to help farmers These programs could serve as focal points for development activities on-site and in the region

IX. LESSONS LEARNED

1 Cooperation between countries can provide solutions to problems common to both entities When possible, exchanges of scientists and technicians between the two countries should be similar in numbers and durations

2 Many donor agencies contribute to work on targeted areas such as the resettlement farmers Where possible donor agencies should complement the work of each other

3 Scientists from Egypt and Israel have collaborated successfully on several components (such as the tree fruit development) of the Maryut site development

4 When there is active support from the USAID Mission and U S Embassy, it contributes to the success of MERC projects

5 There was a lack of specifics to use as a basis for evaluating whether technical objectives were reached On the other hand, technical objectives were not very specific to begin with To allow effective evaluation of projects, objectives should be specific and directed

APPENDIX A: Scope of Work

Project Evaluations For

Cooperative Arid Lands Agricultural Research Project
Maryut Integrated Agroindustrial Complex Project
Moroccan Cooperative Agricultural Development Project

Scope of Work

Context of these projects and evaluations

The goal of the MERC program is to promote peace between Israel and its Arab neighbors and to facilitate development that will improve the well being of the people

The premise of the MERC program is that people who work together in a truly collaborative manner to solve common problems or to develop shared opportunities substantially enhance their knowledge and understanding of each other, of their respective cultures and heritages, and their common goals and aspirations

A further premise of the MERC program is that participating country sectoral development programs are strengthened and enhanced by regional cooperation projects that bring together national experts and expertise in collaborative technological or scientific efforts focused on common economic or social development priorities A corollary is that if successful, regional cooperation projects can help attract additional financial resources, public and/or private, to common economic or social development programs

Projects supported by the MERC program, the results produced by those projects, and those participating in them are likely to become important examples and focal points for the development and spread of further mutual understanding to colleagues within participating institutions and nations, and to other entities within the region

Active, focused, and broadly based regional cooperation among the countries of the Middle East is, therefore, the fundamental goal of the MERC program Thus defined, regional cooperation is the principal goal of MERC projects and cooperation is an integral feature or characteristic of all stages of MERC project activities, from conceptualization and planning through implementation to completion

Section one. Activities to be evaluated

Three projects will be evaluated by one team This unusual practice is justified by the following similarities among the three projects
1) All three projects are MERC initiatives, thus intended to promote regional cooperation between Israel and her Arab neighbors through specific project level collaborative activities
2) All three projects have the same US cooperator - San Diego State University Foundation, (SDSUF)
3) All have the same Israeli cooperator, Ben Gurion University, and the same principal investigators
4) Protected agriculture in an arid environment is a main component of each project
5) The goal of each project is to develop export quality horticultural products for the winter European market
For these reasons and to reduce the cost of evaluation, the three evaluations will be done at the same time by the same team

The three projects are
1) Cooperative Arid Lands Agricultural Research, (CALAR II)
2) Maryut Integrated Agroindustrial Complex, (Maryut II)
3) Moroccan Cooperative Agricultural Development, (Morocco)

Section two Purpose of Evaluations

This is the mid-term evaluation of the Maryut II and the Morocco projects, and the final evaluation of CALAR II The purpose of these evaluations is to determine whether or not significant progress is being made, compared with that expected, toward the stated objectives of the subprojects, and whether or not annual work plans were realistic and successfully implemented It is also important to analyze the Steering Committee/Technical Committee method of management, to determine to what extent the two committees reviewed work under way, revised the annual work plans relative to success of specific activities, and whether or not it is cost effective to support two committees Since there is a Congressional mandate for the MERC program to foster cooperation and collaboration between Israel and Egypt/Morocco, specific attention is to be given to determining the nature and extent of this cooperation, and whether project activities are conducted in parallel or are truly collaborative
The team is to comment on the extent to which the subprojects of the Maryut and Morocco projects are on track with original or approved plans to generate worthwhile technology, have the potential for generating technology by the end of the project, or would benefit from restructuring

Project One

The Cooperative Arid Lands Agricultural Research Project

Background of CALAR II

In 1980, the governments of Israel and Egypt expressed common interests in arid land agriculture and executed agreements to that affect The CALAR project was initiated in March, 1982 It was funded for 5 years at a level of $5,000,000 and was eventually extended, for a total of 8 years There were three main research activities

The use of saline water to produce crops in arid environments,
- Improving the production of small ruminant animals (sheep and goats) in desert environments,
- Trials of plant species not native to the two countries, which might have promise as commercial or forage crops, or for production of industrial raw materials

The final evaluation of the first CALAR project in 1988, indicated that cooperation among the scientists of the two countries had been successful There was also established friendly policy and administrative coordination among the trinational entities In meetings to develop CALAR-II, the parties agreed to concentrate on protected agriculture and phase out the small ruminant activities

CALAR-II is funded under the Middle East Regional Cooperation Program The overall goals of the CALAR-II project are to foster cooperation among Egyptian, Israeli, and U S scientists, to strengthen institutional linkages among the cooperating countries, and to focus on problems of protected agriculture in arid lands, concentrating on crops and technologies of significance to Israel and its Arab neighbors

The overall objectives of this multi-disciplinary program are
1 Development of protected agriculture as a means to produce competitive export products, as well as for providing food for domestic consumption
2 Expanding cooperative applied research efforts between Egypt and Israel
3 Improvements of the socioeconomic status of farmers and growers in the participating nations
4 The development of new productive lands in Egypt and the preservation of the fragile ecosystems in those lands

Six major research activities were initiated in Egypt and Israel to address the above overall objectives The crops to be studied are those that are now

in demand in the local and export markets and the crops that are now being grown in protected agriculture in the two countries In addition, the project will identify and study new crops with high potential and high profitability The titles of the subprojects to be evaluated and the objectives of these activities follow

1) Agromanagement

The objective is to conduct research on the following components of protected agriculture

a Conduct research on the use of artificial root-growth substrates relative to crops grown in protected environments,

b Study the optimal planting dates for each crop under conditions prevalent in the program,

c Research the optimal methods of intensive cultivation such as the manipulation of plant architecture and plant density as a means to increase yield of high quality melons,

d Study various combinations of irrigation and fertilizer application for optimal growth,

e Conduct research on reducing the reliance on chemicals for disease and pest control, and

f Utilize computer-aided techniques in gathering and assessing the data required by CALAR II researchers

2) Environmental modifications

The objective is to study various methods of heating, cooling, ventilating, shading, and using CO_2 enrichment to optimize crop production and quality in protected agriculture

Research is to

a Study the ways and combinations of ways that environmental variables (heating, cooling, ventilation, carbon-dioxide enrichment, and shading) can affect plant growth, and

b Study the use of unconventional heat sources for protected environments such as geothermal water, waste water from power plants and various water sleeves

3) Structure Selection

The design, construction material, and selection of optimal structures for selected crops at the most favorable cost will be studied

a Study the use of inexpensive solar greenhouses, film plastic, and flexible P V C sheets, and

b Conduct studies on various shading levels and its effect on heat levels in the greenhouses and on fruit quality

4) Genetic modification
The objective is to breed plants to be grown in protected environments with the following traits
a The development of salt and heat/cold tolerant cultivars,
b The improvement of the quality of selected vegetable, fruit, and ornamental species for the export market,
c The introduction of insect and disease tolerance, and
d The extension of shelf life and keeping quality

5) Post-harvest aspects
The objective is to study optimal harvest dates, cooling, methods to extend shelf life, packaging, controlled storage, and marketing and economic assessment Specifically, research will center on the following topics
a The optimal season for markets, both domestic and for export,
b The volume of the existing market and forecast of potential markets,
c An estimation of production costs, market price, and profitability of the various production systems,
d Studies of product handling to aid in extending shelf life, and
e Studies on harvest dates and relevant environmental control for storage and shipping

6) Floriculture and new crops
The objective is to develop new, high-value crops for the export market, using techniques that are suitable and cost-effective for farmers in Egypt and Israel Examples of studies to be conducted are
a Collection and domestication of arid plants with a high export value, and
b Studies of ornamental plants of known export value in both protected and open-field conditions

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Project Two

The Maryut Integrated Agroindustrial Complex Project, (Maryut II)

Background of Maryut II
The **Maryut I** project was initiated to develop technology useful to the agricultural graduates that were given land to farm in the newly settled western desert During this first phase, much of the physical structures at

the Maryut site were constructed including the office, packing and grading sheds, irrigation systems and greenhouses Israel had found interesting differences in saline tolerance in cultivars of melon The Maryut II was approved to allow the project to refine the crop management recommendations, to finish the training and extension facilities at Maryut, to prepare extension material and to train extension workers, and to increase the nursery capability to supply farmers with planting material

Maryut II is funded by the Middle East Regional Cooperation Program The overall goals of the project are to promote the spirit of cooperation between Israeli and Egyptian scientists, to strengthen institutional linkages among the cooperating countries, to develop technologies, cultivars and methodologies for intensive agricultural production in Egypt's western desert, and to develop farm settlement models geared for the needs and capabilities of university graduates and farmers who will settle these lands In order to reach these goals, the project will assist in the development of the agro-industry in the newly reclaimed lands and will develop the Maryut site as a center for technology generation and dissemination and as a center for training and extension

The program in Egypt has six major topics, with one or more specific objectives under each topic, and the program in Israel has nine activities Research in these topics will be conducted in collaboration, in parallel, or addressed separately in Egypt and Israel Results are shared among all participants

The topics in Egypt and the objectives of these topics are

A. Protected Agriculture

1 Various greenhouse structures and coverings will be tested, including glasshouses, plastic covers, and screen houses,
2 All aspects of crop management systems will be tested for selected crops, from land preparation to post-harvest treatment, and recommendations for optimal production developed, and
3 Crops and cultivars of vegetables, fruits and ornamental will be tested in non-heated greenhouses, tunnels, under shade, and with saline water to develop quality produce for the local and export markets

B Open Field Intensive Crop Research

4 The objective includes extensive varietal testing of ornamentals, flowers, and vegetable crops such as asparagus, lettuce, sweet corn, and processing tomato

C Tree crops and Grape Research

5 Research will concentrate on developing and extending new varieties of deciduous tree crops that are compatible with warm winters and calcareous soils

D. Nursery

6 A nursery will be established near the main desert highway connecting Cairo and Alexandria to supply farmers with quality plant material that will be the basis of modern intensive agriculture in the Western Desert

E Post-harvest Handling

7 Research will deal with
- optimal harvest time,
- ripening stages,
- sorting and grading,
- preservation treatments to extend shelf life, and
- packing methods and testing of packing materials

F Training and Extension

8 The objective is to develop a center for training of extension workers and farmers and to design and distribute technical publications

The topics in Israel and the objectives are

A. Development of new cut flowers for winter marketing

1 Increase the flexibility in changing species and cultivars of cut flowers for export This will assist the horticultural industry in the Negev and Maryut

B Native annual plants for environmental gardening

2 The botanical and horticultural characteristics of Israeli annual flora will be studied to develop them for commercial use in Israel and the Maryut site The saving of irrigation water is the principal interest

C. Development of woody plants as cut flowers

3 Studies include crop selection and ways to reduce the intensive culture, high level of expertise, and high costs generally associated with woody plants grown for cut flowers

D Eucalyptus for flowering and decorative branches

4 Research will address propagation, dwarfing, salt tolerance, reduced intensiveness, and open field plantings

E Control of tomato quality

5 This research will seek to establish correlation between growing conditions, physical and chemical parameters, and organoleptic guidelines

F Protected agriculture
6 Various greenhouse structures and covering will be tested to find ways to produce crops at the most desirable economic period for off season crops, and
7 Research will concentrate on optimization of management systems for melons and tomatoes for optimal fruit quality

G. Open field intensive crop research
8 This research will center on flowers from seed, hardy woody ornamentals, and potatoes and melons grown on sandy soils with saline drip irrigation

H Tree crops and grape research
9 Research efforts will include the selection of salt tolerant cultivars that are compatible with warm winters and calcareous soils

I Post-harvest handling
10 Research will deal with fruit acidity, pH, starch content, shelf life, and economic evaluation of quality control

Project Three

The Moroccan Cooperative Agricultural Development Project, (Morocco)

Background for the Morocco project
This five year project runs from September 1992 to September 1997 The approved LOP funding is $4,939,000 This was the first MERC project between Israel and an Arab country other than Egypt and the first with a non-government cooperator, an agribusiness company called the Maghreb Agricultural Cooperative in Azemour, Morocco The project calls for an Israeli technical expert to be assigned to the project site in Morocco

The Moroccan Cooperative Agricultural Development Project, (Morocco), is funded under the Middle East Regional Cooperation Program The overall goals of the project are to foster cooperation between Israeli and Moroccan scientists, to strengthen institutional linkages among the cooperating institutions, and to increase the ability of Morocco's agriculture sector to meet internal demands for agribusiness projects and to increase agribusiness exports from both Israel and Morocco

The specific project objectives in Morocco are·
1 To construct a speedling nursery with an initial capacity of one million seedlings a year of tomatoes, peppers, cucumbers, and melons for farmer use

Capacity will increase to five million seedlings/year by the PACD
2 A pot-plant nursery will be constructed to produce rooted seedlings and finished pot plants of ornamentals for both the local and export markets
3 To develop commercial micro-propagation capacity in Morocco of disease free material, mainly banana and carnation, for local growers who now import their planting stock
4 To develop optimum cultural practices for the production of open field grown ornamentals collected from Morocco, Israel, Australia, and California
5 To experiment and demonstrate all parameters of open field and greenhouse production of vegetables for the fresh market and processing industries
6 Extension staff of Hassan II Institute and the National Institute for Agricultural Research will be trained at the Azemour project site and they, in turn, will help train groups of farmers at the site

The specific project objectives in Israel are
1 To breed high quality, high yielding processing tomatoes for Morocco
2 To develop management procedures for onion production based on plant physiology and nutritional needs
3 To study the effects of environment and seed treatment on growth and germination of *Verticordias* for flowering branches and pot plants
4 To make extensive truffles collections in Morocco and to domesticate the truffles for commercial production
5 To conduct tissue culture (micro-propagation) studies on Eucalyptus and banana at Ben Gurion University and to train Moroccan technicians
6 An economic and marketing study will be conducted on the crops and products being studied under the project

Section Three Statement of Work

There are three major areas of concern in these evaluations 1) management, 2) cooperation, and 3) technical progress toward meeting the stated subproject objectives on schedule

The following components should be considered and addressed in the team's reports, as well as additional items based on the professional judgment of the team members The discussion of each component should be concise, identifying factors affecting implementation in the context of the project purpose and the logical framework Recommendations should be confined to significant factors that can be implemented and that will result in increased cooperation or in generating more useful technology for the target farmers Mid-term evaluations should address the need to consider which activities are potentially successful and should receive more resources in a reallocation of resources within the project, and which

activities appear to have less potential for success and should receive less resources The economics of protected agriculture is dynamic and the profitability of many of the crops being researched may change during a five year period The team should assess whether or not the economic and marketing studies have been done and are relevant, and whether current and projected market prices remain favorable for the target commodities Also, comment on whether or not the marketing data are regularly updated in response to market changes

Management:
Assess the project management and the design format of the three for the following
- Assess the U S institution in its back-up role in relation to coordination of work, fund flow, report submission, research monitoring, equipment purchasing, convening meetings, and communicating with all parties, including AID
- Are technical reports filed in a complete and timely manner? Do the annual and semi-annual reports contain hard data to verify progress?
- Can the participants at technical meetings and workshops openly discuss each others' research in a typical peer review fashion?
- Do funds flow to PIs as planned, and are financial reports submitted on schedule?
- When the MERC program was initiated, the Steering Committee was an essential management component because senior officials were needed to encourage and protect cooperating scientists Is this committee still necessary?

Cooperation·
Strengthening institutional linkages among the cooperating institutions and countries is a major objective of each of the projects Quantify the amount and sustainability beyond the life of the project of the cooperation between Israeli and Egyptian/Moroccan scientists and technical and administrative personnel generated by this project by noting the following
- Number of scientists, others, and institutions of both countries involved in the project
- Number of scientists visiting counterparts' work sites
- Number of co-authored publications or presentations at international meetings
- Evidence of data, germplasm, analysis, students, and insights exchanged
- Distinguish between collaborative research between Israeli and Egyptian/Moroccan scientists on a single activity and that which is merely conducted in parallel

Specific progress toward subproject objectives
The subprojects of each project should be evaluated to determine whether they have accomplished what was planned by the technical committees and set as goals in the annual work plans A listing of research conducted and technology generated should be compiled Other accomplishments, such as training, equipment purchases, and technology transfer are to be noted and compared with planned progress The team members should comment on whether or not each of the subprojects will reach its intended objective by the PACD and what steps will be necessary to reach the objective
(Refer to appendix I for a list of specific questions for each of the subprojects to assist the team in their deliberations with the project scientists)

Section Four Methods and Procedures

The team will follow the format and guidelines established by USAID in the supplement to Chapter 12, AID Handbook 3, entitled
AID Program Design and Evaluation Methodology Report No 7

The team will use the following document review, data collection, and interview methods,
1) Attend briefing in AID/Wash and in U S Embassies in Cairo, Tel Aviv and Rabat
2) Review all relevant project and grant papers, progress reports and previous evaluation reports
3) Interview members of the trinational steering and technical committees, subproject principal investigators, and examine activity records, data analysis, and conclusions
4) Brief the project coordinator of each country of your findings and then brief AID/Wash before writing the final evaluation report

The schedule for the evaluation is attached

Section Five Evaluation Team Composition

The team will consist of three professionals with the following qualifications
1) A Protected Agriculture/Horticulture expert that will be able to analyze and assess the biological science aspects of the six major activities This expert should have a PhD in a botanical science and have a current position in research in protected agriculture It is not assumed that any individual will be an expert in all of the subprojects, but with the assistance of the other team member, should be able to ascertain progress attained and steps needed to correct progress delays Demonstrated

technical writing abilities are essential and previous evaluation experience is desirable

2) An Agriculturist or Sociologist to examine evidence of cooperation and collaboration between and among project participants, including scientists, managers and others, and the development of cooperative or interdependent institutional linkages among the institutions involved in the projects, and among sister national institutions, if any Evidence of linkage into international research networks should also be examined

3) An Agronomist/ Agricultural Research Management specialist/Team Leader This expert should have an advanced degree in Agronomy and experience in the crops and environment central to these projects He or she should be knowledgeable in research organization, system functions and research methodology in order to comment on research procedures in the projects and whether the management of these projects might profit from reorganization

Each team member should have adequate experience in their respective fields The only language requirement is English proficiency Prior work in Egypt, Israel or Morocco will be considered a strong plus A laptop computer will be provided to each team member and members are expected to be proficient in the use of word processing

Section Six Reporting Requirements

An evaluation report will be written for each project

The format of the evaluation reports will follow AID guidelines established in, The supplement of Chapter 12 of AID Handbook 3

The reports will include an executive summary, project data sheet, table of contents, findings, recommendations, and appropriate appendixes (evaluation scope of work, list of people contacted, bibliography) The body of the reports, exclusive of executive summary and appendixes, should not exceed 30 single spaced pages The evaluation team will formulate their findings and from these prepare a set of conclusions for each of the objectives of the subprojects as well as for management and cooperation For the mid-term evaluations, a set of recommendations will be prepared that will help ensure that the objectives of the project can be successfully concluded by the project PACD The final evaluation will concentrate on determining whether the project was successful in meeting its stated end of project objectives and what further activities might warrant consideration

The report will be written jointly by all members of the team under the coordination of the team leader, who will be responsible for briefing appropriate USAID, U S Embassy and host government officials The team leader is responsible for the timely submission of the final report

A draft of the recommendations to be included in the evaluation report is due prior to the team's departure from the Middle East countries and is to be discussed with the U S Embassy/USAID in each of the three countries The final report will be completed prior to the team leader's return home or at a reasonable later date negotiated with the contractor, but in no case later than 30 days after completion of the evaluation

Section Seven· Funding

Financial support for the evaluation will be supplied by A I D

Appendix I Additional questions to be addressed

Management questions for the three projects
- How valuable has the internal evaluation been as a management tool? Were any worthwhile recommendations made and did the project steering committee act on any of them?

- The project has U S consultants serving on the project technical committee, some serve on more than one SDSUF-MERC project Does their input into the project result in positive, documented change? If so, please state

- Review the steering committee reports and analyze the benefit of the two committee (technical and steering) system Could the technical committee be restructured in such a way to serve both purposes?

Related to specific activities in the CALAR II project
a) Agromanagement
- What has been the growth response of tomato to saline irrigation?
- What is the role of Calcium and Cobalt in salt tolerance of melons?
- Is there any progress in reducing chilling injury to cucumbers?

b) Environmental modification
- Are there any specific recommendations on use of growth mediums, air temperatures, and relative humidities for the crops being studied?

c) Structure selection
- What are the results on the optimal use of shading materials, fans, and size of plastic houses, on crop production in the summer months? Do results so far justify continuing this work?

d) Genetic modification
- Quantify specific documented success in developing plant cultivars that are superior in salt, heat, or pest tolerance
Have any improved varieties been developed and commercially grown that were a result of this project?

e) Post-harvest aspects
- Report on any progress in the studies on cooling, shelf life, packing and controlled storage of any of the crops researched

f) Floriculture
- Have any new crops been offered to farmers for adoption and what was the market response?
Related to specific activities in the Morocco project
- The project has completed its third draft of an economic and marketing study Is the study being used to guide the project as claimed?
- Israel is breeding high yielding tomatoes for Morocco Name the promising cultivars and their potential yield
- Is the chart showing all activities and progress for Morocco prepared by UC Davis a useful tool for project management and evaluation?
- Why did it take half the project life to decide whether to build the micro-propagation unit at the project site? Did the technical and steering committee function properly to resolve this dispute?
- The technical committee has recommended that the onion research should be terminated by October 1994 and that another activity should be chosen to replace it How can this management decision be resolved without waiting for the annual committee meetings?

APPENDIX B: Contacts Made During Evaluation of CALAR II and Maryut II Projects

USAID Washington, D C

John Daly, Ken Prussner, Herb Blank, Pamela Mandel, Sheree Belamy, Charles Uphouse

Winrock International, Washington, D C

Floyd Williams, Edward Rice, Vicki Walker, Doug Clark, John Pino

U S Project Members at San Diego State University Foundation

Mohamed El-Assal, Bonnie Stewart, Harry Albers, Frea Sladek, Tim Hushen, Davene Gibson, David Moore

Other U S Project Members from U Cal Davis

Dr Michael Reid, Dr Adel Kader, and Richard Jones (by phone)

American Embassy, Israel

David Mulenex, Science Advisor

Israel Project Members/Contacts

Dr Samuel Pohoryles, Dr Dov Pasternak, Dr Irena Rylski, Mr Ben Ami Bravdo, Prof Y Fulman Joel Schechter, Dr Yitzhak Abt, Yoseph Elkana, Uri Dror, and Israeli scientists (see evaluation schedule)

Egypt Project Members/Contacts

Dr Adel Beltagy, Mr Mohamed Dessouki, Dr Ayman Abou-Hadid, Dr Awad Hussein, Dr Mohamad Beltagy, H E Dr Mahmoud Mahfouz, Mr Itzhak Ayalon (former advisor to Maryut site), and Egyptian scientists (see evaluation schedule)

American Embassy, Egypt

John Davison Economic Officer Russel A La Mantia, Jr , Minister/Counselor for Economic Affairs and Edmund Hull DCM

USAID Mission, Cairo Egypt

David Delgado, Director, Office of Agriculture

Other Contacts Made

Egypt

Dr Hamid El-As Doudi, Faculty of Agriculture of Ain Shams, University and Seedsman

Sabry Elsayed Abd Allah, Vice Chairman of NUBASEED Co

Hisham M Fahmy, Office of Foreign Relations, MALR

Tarek Hassan, Dokki

Dr Karim Faraq, Univ of Alexandria, College of Environmental Agriculture at Damanhoun

Israel

Prov A Shimshony, Director, MOA Veterinary Services and Animal Health

Lechaim Naggan, Vice-President and Dean for Research & Development, Ben Gurion University of the Negev

David Wolf, Acting Director, Ben Gurion University of the Negev, The Institutes for Applied Research

APPENDIX C: References Consulted During Evaluation of CALAR II, Maryut II, and Morocco Projects

1 Integrated Agricultural Development Project Maryut Agroindustrial Complex in the Western Desert of Egypt Continuation and Expansion Submitted May 1990 and revised July 1990 Request submitted to the Bureau for Asia and Near East USAID
2 Final Evaluation Report The Cooperative Marine Technology Program for the Middle East Final Evaluation Report July 1993
3 Cooperative And Lands Agricultural Research Project Mid term Evaluation Feb & March 1993
4 A I D Evaluation Handbook Supplement to Chapter 12 A I D Handbook 3 Project Assistance April 1989
5 Maryut Project Internal Evaluation Sept 1993 Dr R A Jones
6 Final External Evaluation Trinational NUBASEED Development Project Report Oct 1992
7 Draft MERC Program Guidelines for individuals interested in preparing unsolicited grant proposals to the MERC program December 1994
8 SDSUF Contractual Subgrant with the Egyptian Ministry of Agriculture for the Maryut II project
9 Maryut II Integrated Agricultural Development Program request for a revision to the Office of Procurement USAID Dec 15 1992
10 Documentation of GRANT Amendment of Contract by USAID
11 Amendment Number 1 Subgrant between SDSUF and the Egyptian Ministry of Agriculture of the Arab Republic of Egypt
12 Amendment Number 2 Subgrant between SDSUF and the Egyptian Ministry of Agriculture of the Arab Republic of Egypt
13 Amendment Number 3 between SDSUF and the Egyptian Ministry of Agriculture
14 Setting an Agenda for Cooperative Development in the Middle East Publication of the Center for Social Policy in the Middle East May 1986
15 Review of Middle East Regional Cooperation Program (Project No 398-0158 25) Feb 1991
16 Annual Technical Progress Report (Oct 1993 to Sept 1994) of Moroccan Cooperative Agricultural Development Project submitted to USAID (Bureau for the Near East) by the SDSUF
17 Cooperative And Lands Agriculture Research Program II (CALAR II) A Program in Protected Agriculture Sponsored by the Joint Agricultural Committee Egypt Israel Submitted by SDSUF to USAID Bureau for Near East (Abridged version)
18 Small Farm Handbook Small Farm Center Univ of Calif Division of Agriculture and Natural Resources Oct 1994
19 Small-Scale Postharvest Handling Practices A manual for Horticultural Crops L Kitinoja and Adel A Kader Dept of Pomology Univ of Calif at Davis Jan 1994
20 Maryut II Workplans for 1994/95 Revised at the Maryut II Technical Meeting held in Cairo June 1994
21 Maryut Newsletter Spring-Summer 1994
22 Progress Report on the Achievements of Different Activities in Maryut Project April 1994
23 Report Schedule of Maryut II for Israel
24 CALAR II Fourth Annual Scientific Workshop Schedule and list of participants San Diego California May 2-6 1994
25 The Second CALAR II Workshop Book of Abstracts Beer-Sheva Israel March 13-20 1992
26 CALAR II Third Scientific Workshop Book of Abstracts Alexandria Egypt March 8-11 1993
27 Abstracts of the CALAR II Fourth Annual Scientific Workshop San Diego California May 2-6 1994

28 Cooperative Arid Lands Agriculture Research Program II Newsletter for Winter/Spring 1994
29 Cooperative Arid Lands Agriculture Research Program II Newsletter for Fall 1994
30 Cooperative Arid Lands Agriculture Research Program II Newsletter for Summer 1992
31 Cooperative Arid Lands Agriculture Research Program II Newsletter for Winter 1991
32 CALAR II Annual Technical Report Sept 30 1993-March 31 1994 Submitted by SDSUF
33 Communique from USAID promulgating Grant # HNE-0158-G-00-2075-00 to SDSUF (including estimated budget) Aug 28 1992
34 Required Revised Economic Analysis for Maryut II Integrated Agroindustrial Complex in the Western Desert of Egypt SDSUF December 1993
35 MOROCCO REPORT Newsletter of the Moroccan Cooperative Agricultural Development Project SDSUF Spring 1993
36 Morocco Report Newsletter Fall 1993
37 Morocco Report Newsletter Fall 1993
38 AMARIS Morocco Project Newsletter Fall 1994
39 Integrated Agricultural Development Project Maryut Agroindustrial Complex in the Western Desert of Egypt External Evaluation April 14-18 1990
40 Grant authorization to SDSUF for the CALAR II Program June 1990
41 Agricultural Development in the Middle East in A Regional Context Middle-East Peace Negotiations Multilateral Wroking Group on Reg Econ Development Final Report August 1994
42 San Diego State University Foundation Annual Report (Five Decades) 1992-93
43 Researh abstracts of Scientists at Volcani Institute Institutes for Applied Research of Ben Gurion University and the Rehmat Negaav Station
44 Micro Propogation of Ornamental Eucalyptus Training Work of Fatima Agid Annual report Aug 1993 - July 1994 David Mills Shivta Wenakart and Fatima Agdid Submitted to AID/MERC by the Institute of Agriculture and Applied Biology
45 Irrigation with Brackish Water under Desert Conditions VIII Further Studies on Onion (Allium cepa L) Production with Brackish Water Y De Malach S Mendlinger I Borovic and N Abd El Salam Jan 1989
46 Human Resources of Agricultural Research in Egypt Arab Republic of Egypt Ministry of Agriculture and Land Reclamation Agriculture Research Center Information and Documentation Center Dec 1994

APPENDIX D: CALAR/Maryut II Evaluation Schedule

Mon , Dec	12	Dr Fink Travels to Washington D C for meeting with Winrock, Int , evaluation team and USAID
Tue , Dec	13	Team meeting in Washington, D C
Wed , Dec	14	Team meeting in Washington, D C
Sun , Dec	18	Dr Rodney Fink, Leader of the evaluation team, travels to San Diego
Mon , Dec	19	Dr Fink visits SDSU Foundation In the evening, Dr Fink, Dr Mohamed El-Assal and Dr Bonnie Stewart Travel to UC Davis
Tue , Dec	20	Drs Fink, El-Assal and Stewart meet with Drs Adel Kader and Mike Reid at UC Davis Drs El-Assal and Stewart return to San Diego in the evening
Wed , Jan	4	Evaluation team members Drs Rodney Fink, Mary Peet, Jody Garbe and David O'Brien depart the U S for Tel Aviv, arriving Jan 5, 1995
Thu , Jan	5	Team arrives in Tel Aviv at 7 00 p m & proceeds by taxi to the Moriah Plaza Hotel155 Hayarkon Street
Thu , Jan	5	7 00 p m Business dinner at the Moriah Plaza with the Israeli CALAR/Maryut/Morocco Steering Committee Members Drs Samuel Pohoryles, Itzhak Abt, Irit Rylski, Lechaim Naggan, Joel Schechter, Itzhak Peretz and Dov Pasternak
Fri , Jan	6	9 00 a m Meet with scientists and TechnicalCommittee Member of Morocco project
Sat , Jan	7	Meet with Protected Agriculture Farmer in Arava Valley (growing melons in solar greenhouse)
Sun , Jan	8	9 00 a m visit Volcani Institute and project sites CALAR and Morocco sites until 4 00 p m Travel to Beer-Sheva in the evening Overnight at the Desert Inn Hotel, P O Box 246, Beer-Sheva, 84 102
Mon , Jan	9	9 00 a m to 4 00 p m Visits Ben Gurion University/Institute for Applied Research Meet members of the CALAR/Morocco Projects Business lunch with Professor Lachaim Naggan, Vice President, BGU, and Mr Moshe Amir, Accounting Dept , BGU
Tue , Jan	10	9 00 a m to 5 00 p m Visits the Ramat Negev Experimental Station Meet scientists of the Maryut Project Presentations by Maryut Scientists and site visitations Return to Tel Aviv in p m Overnight at Moriah Plaza Hotel
Wed , Jan	11	Team meets with David Mulenix, Science Attache at the U S Embassy Write reports P M Meeting with Pohoryles and Israeli Committee Memebers
Thu , Jan	12	Write reports Fink & O'Brien travel with Mr David Mulenex, Science Attaché at the U S Embassy to the Veterinary Institute near Volcani to meet with Arnon Shimshony and others of the Institute

		about a MERC program and their plans for an extension Dr Peet visits with individual scientists at Volcani Institute and Hebrew University Late in the day, travel to Cairo via El Al flight 443 departing 8 00 p m arriving in Cairo at 9 20 p m proceed by taxi to the Cairo Nile Hilton Tahrir Square, Cairo, Egypt
Fri , Jan	13	Meet at 7 00 p m with CALAR II and Maryut II Egyptian Steering Committee Members Dr Adel El-Beltagy, Mr Mohamed Dessouki, H E Dr Mahmoud Mahfouz
Sat , Jan	14	Meet at Dokki at 9 30 a m with the Egyptian CALAR II scientists until 5 00 p m Presentations by 30 students and scientists
Sun , Jan	15	8 00 a m - 9 00 a m Meet with Mr David Delgado, USAID Mission in Cairo, and with Mr John Davison & Russell LaMantia, US Embassy in Cairo Meet at Dokki at 10 30 a m with Maryut II Scientists Presentations by the scientist
Mon , Jan	16	7 45 a m - 9 00 a m Meet with representatives of Mr David Delgado (absent), USAID Mission in Cairo, and Mr John Davison, Political Attaché, US Embassy in Cairo, and Mr Russel LaManta Visit CALAR II lab and sites at the College of Agriculture, Ain Shams University, Shubra El-Khaima Visit CALAR II site at Shalakan
Tue , Jan	17	Depart Nile Hilton Hotel at 7 30 a m travel to the Maryut II R&D site on the Cairo - Alexandria desert road Visit site until 4 30 p m , then proceed to Alexandria Overnight at the Helnan Palestine Hotel, Montazah Plaza Alexandria, Egypt
Wed , Jan	18	Depart Helnan Palestine Hotel at 9 30 a m to visit CALAR II sites at El-Bousseily Return to the Palestine Hotel at end of day
Thu , Jan	19	Check out of the Palestine Hotel early in the morning Team Leader, accompanied by an Alexandria Private Sector Seedsman, visits the NUBASEED Project site and rejoins team at Maryut site Visit farmers in the Maryut area, Bustan and Bustan Extension and along Cairo Desert Road benefitting benefiting from the Maryut R&D unit Check into the Nile Hilton Hotel (see above)
Fri , Jan	20	Write CALAR II and Maryut II reports
Sat , Jan	21	Free day
Sun , Jan	22	Write CALAR II and Maryut II reports Meet with David Delgado(USAID) at 1 00 P M
Jan	23	Write CALAR II and Maryut II reports
Tue , Jan	24	Meet with Mr David Delgado, AID Mission and Mr John Davison, US Embassy, for an exit interview
Wed , Jan	25	Team travels to Morocco via Gulf Air 81, Departing Cairo 2 00 p m Arriving Casablanca 5 40 p m , travel to Sheraton Hotel

Evaluation Committee - MERC Programs

Timetable for visitation at the Volcani Center
8/1/95

9:00 - 09·30	Meet Prof Y Fulman - Chef Scientist, Ministry of Agriculture
09·30 - 10 00	Effect of root restriction, nutrition and hormonal balance on quality of tomato fruit - Drs Asher Bartal and Eitan Pressman
10 00 - 10 30	Genetical, biochemical and environmental factors determining fruit quality in melons - Dr Arthur Schaeffer
10 30 - 11 00	Effect of environment on fruit quality of pepper - Dr Beni Aloni
11 00 - 11 30	1) Breeding of high quality open field tomatoes 2) Control of plant size in "Speedling" nurseries Drs Moshe Bar and Eitan Pressman
11 30 - 12 00	Breeding of greenhouse tomatoes for tolerance to the Yellow Curled Leaf virus - Dr Meir Pilowsky
12 00 - 12·30	Collaboration with the extension service Mr Omar Zeidan
12 30 - 13·30	Lunch
14 00	Depart to Beer - Sheva
15 00 - 16·30	Visit "Sde Teiman" plot - introduction of open field ornamentals

Evaluation Committee - MERC Programs
Timetable for Meetings at the Institutes for Applied Research
Ben - Gurion University
January 9, 1995

08 30 - 09:00	Meet Director - Prof David Wolf
09 00 - 11.30	Visit research sites at IAR
11 30 - 12 00	Research on melon breeding for winter season - Sam Mendlinger
12 00 - 12 30	Research on Flowers - Dr Ruth Shillo
12 30 - 13 30	Lunch with Prof David Wolf and Mr Moshe Amir (Director - Research Contracts)
13 30 - 14 00	Solar greenhouse - Drs Dov Pasternak Eli Korin, Uri Drori
14 00 - 14 30	Pitaya - a new fruit for greenhouses Research on Argan Dr Avinoan Nerd
14 30 - 15 00	Research on the Moroccan Truffle - Drs Varda Zur and Nurit Bejerano
15 00 - 15 30	Tissue culture propagation of Eucalyptus - Dr David Mills
15 00 - 16 00	Verticordia - a new species for decorative branches - Mr Y Ben Dov

Evaluation Committee - MERC Programs

Visitation to Ramat Negev 10/1/95

8 15	Leave hotel
9 00 - 9 30	Description of Ramat Negev R&D, Y Moscovic
9 30 - 10 00	Description of Ramat Negev Station, Y De Malach
10 00 - 11 30	Meet Maryut Technical Committee and Scientists
11 30 - 12 45	Visit Farm
13 00 - 14 15	Lunch & tour at Kibbutz Revivim
15·00 - 16 30	Visit Moshav Kadesh Bunnea Application of CALAR technology in saline irrigation of melons
16 30	Return to Tel Aviv

Egypt CALAR II Scientific Team
Preesentations to Team

Ayman Abou-Hadid Principal Investigator
- Introductory notes for Egypt

1 Dr Saleh Mohamadein — Plant diversity and breeding (Dokki)

- Productivity of snap Beans and egg plant under cover

2 Dr Hosny Khalifa — Infrastructure (Dokki)

- Development of protected Cultivation in Egypt

3 Dr Mohamed Edres — Tissue culture (Ain Shams)

- Ethylene inivlement in vitro regeneration of asparagus
- Propagation of potato using tisse culture technic

4 Dr Samir O El-Abd — Physiology (Ain Shams)

- Ethylene production from tomato and cucumber plants under saline condition
- Seed germination of tomato and cucumber in salinzed condition and prevention of its effect

5 Dr Mahmoud Hafes Mahmoud — Agromangement **(Dokki)**

- Studies on the use of some local materials for growing cucumber in closed recirculated hydroponic system
  Comparative studies on different cucumber growing media under protected cultivation in Egypt

6 Dr El-Sayed Abo-Fotouh Omar — Physiology (Ain Shams)

- Studies on the effect of salinity on the growth yield and soil and oil composition of thyme plants
- Yield and Chemical Composition of Both Sweet and hot Pepper Under Greenhouse house conditions
- Effect of water regime on the growth flower yield and volatile oil content of marigold (Tagetes Patula)

7 Dr Sayed M Singer — Climate Modification (Ain Shams)

- Amelioration of Chilling injury in cucumber seedings by short-term cold Acclimation
- Increased chilling tolerance by using some mineral nutrient for cucumber seedings

8 Dr Ahmed M Eıssa Soıl and Water (Aın Shams)

- Iron Zınc and Phosphorus relatıonshıp ın nutrıtıonal of tomato seedlıng grown on sandy soıl
- Tomato growth ın calcareous soıls ın relatıon to forms and levels of some marco-and mıcro nutrıents

9 Dr Abo El-Fotouh AbdAlla Breedıng (Dokkı)

- Tomato breedıng for protected cultıvatıon actıvıtıes
- Effect of ınteractıon between NaCl levels and root-zone temperature on growth and seed productıon of cucumber plant
- The ınfluence of Root-Zone temperature and NaCI levels ın the nutrıent solutıon on seed germınatıon and early growth of cucumber seedlıngs

10 Dr Usama A El-Behaıry Hydroponıcs (Dokkı)

- The effect of the source of pH-adjustment acıds on uptake and transport of the ıons for cucumber plants grown ın NFT
- Effect of dıfferent Zenc concentratıons ın the nutrıent solutıon on uptake and translocatıon on marco and mıcro nutrıents on cucumber grown ın NFT

11 Eng Samır R Salman Agromangement (Aın Shams)

- Usıng of commercıal fertılızer ın nutrıent fılm techniques (NFT)
- Plastıc house mıcro clımate condıtıon as affected by low tunnel and plastıc mulch

12 Eng Mohamed Z El-Shenawy Water and Clımate (Aın Shams)

- Prelımınary studıes on the use of aeroponıcs for vegetable crops under local condıtıons
- Lettuce plant grown ın aeroponıcs or hydroponıcs and ıts relatıon to water consumptıon

13 Eng Samı Abdel-Gawad Gafaar Agromangement (Bosseıly)

- The effect of shadıng and GA3 applıcatıon on earlıness and fruıt qualıty of artıchoke
- Studıes on the productıon of off season Jews mallow ın Egypt

14 Eng Mohamed Saleh Agromangement (Bousseıly)

- Studıes on the ımprovement of fruıt qualıty of French beans (Phaseolus vulgarıs L) grown under plastıc houses

15 Wael El-Tohamy Climate Modification (Ain Shams)

- Effect of mineral nutrients and mefluidide treatments on pepper seedings tolerance to chilling stress

16 Dr Gad El-Rub (Dokki)

Research by Other Scientists/Projects and Location of Work

- Dr Hamed El-Saied (Shalakan)

- Dr Abdel-Mohsen Khalil (Bousseily)
- Dr Tarek El-Ragal (Bousseily)
- Eng Amany N Karas Climate and Water (Ain Shams)

  Influence of water-stress levels on growth and development of bean (Phaseolus vulgaris) plants

- Eng Shabaan D Abdel-Aziz Agromangement (Bousseily)

- Dr Saleh Youssif (Bousseily)
- Dr Badawy Abdel-Reheam (Bousseily)

- Dr Abd El-Salam Mohamed Youssif (Bousseily)

- Eng Abdel-Aziz Sheta (Bousseily)

- Eng Ahmad Abd-Alla Abd-El-Samad (Shalakan)

- Eng Maged El-Nemer (Shalakan)

- Eng Mohamed Ibrahim (Shalakan)

- Eng Mohamed Abo-El-Soud (Shalakan)

- Eng Mohamed - Mawgoud R Abdel Marwgoud Water and Climate

  (Abroad)
- Evaluation of some shading materials under Egyptian condition

- Dr Saeid Zakaria Post Harvest (Bousseily)

- Eng Mahmoud A Medany Climate Modification (Abroad)

- The effect of decomposed organic materials on soil water content of some vegetables Cucumber grafting for avoiding soilborne diseases in plastic houses

Presentations by Egyptian Maryut Technical Committee Members
Meetings with Maryut Staff

Jan 15, 1995

1 Dr Awad Hussein (Maryut Project Director in Egypt and expert in post harvest)
2 Dr Shafik El-Gindy (Ornamentals)
3 Dr Abdel Aziz Sheta (Soils expert)
4 Dr Sayed M Singer (Climate Modification)
5 Dr Samir El-Abd (Vegetables)
6 Dr Mahmod Hafez (Vegetables)
7 Dr Hamdy El-Dowein (Vegetables)
8 Dr Asem Shaltant (Fruit trees)
9 Dr Ahmed Salem (Fruit trees)
10 Dr Abdel Ghany El-Gindy (Irrigation Management)
11 Introduction of staff workers of the Maryut II Project

APPENDIX E: Maryut II Travel Summary

Maryut II Travel Summaries, April 1992-December 1994

Egyptian and Israeli (Excludes Technical Committee Meetings)

Year	Dates	Name	Purpose
1993	April 20-22	Yosef Bendov	Sci vis to Cairo and Alexandria
	April 20-22	Ben Ami Bravdo	Sci vis to Cairo and Alexandria
	May 3-9	Ahmed Abdel-Fattah	Agritech Meeting Israel
	May 3-9	Samir El-Abd	Agritech Meeting Israel
	May 3-9	Mohamed El-Ansary	Agritech Meeting Israel
	May 3-9	Abdel-Ghany El-Gindy	Agritech Meeting Israel
	May 3-9	Ahmed El-Sehreegy	Agritech Meeting Israel
	May 3-9	Ashraf El-Shazly	Agritech Meeting Israel
	May 3-9	Abdel Aziz Megahed	Agritech Meeting Israel
	May 3-9	Samuel Mendlinger	Agritech Meeting Israel
	May 3-9	Mohamed Yaser Mohamed	Agritech Meeting Israel
	May 3-9	Usama Kamel	Agritech Meeting Israel
	May 3-9	Mustafa Mustafa	Agritech Meeting Israel
	May 3-9	Sayed Singer	Agritech Meeting Israel
	May 3-9	Essam El-Din Wasef	Agritech Meeting Israel
	May 3 9	Mohamed Youssef	Agritech Meeting Israel
	July 13-Aug 8	Ayman Abou-Hadid	Desert Dev Conf Mexico City/Sci vis SSDSUF Wye College College Station St Paul
	July 29-Aug 3	Maria Cantwell	Desert Dev Conf Mexico City/Sci vis to Mexico City
	July 31-Aug 8	Awad Hussein	Desert Dev Conf Mexico city/Sci vis SDSUF Wye College College Station
	July 31-Aug 6	Dov Pastemark	Desert Dev Conf Mexico City/vis to Mexico City/UC Davis
	July 31-Aug 3	Mohamed Hafez	Desert Dev Conf City Sci vis to Mexico City
	July 31-Aug 3	Irit Rylski	Desert Dev Conf Mexico City/Sci vis to Mexico City
	July 3-Aug 6	Abdel Aziz Sheta	Desert Dev Conf Mexico City/Sci vis to Mexico City/Sci Vis St Paul
	July 31-Aug 3	Samir El-Abd	Desert Dev Conf Mexico City/Sci vis to Mexico City
	July 31-Aug 8	Assem Shaltout	Desert Dev Conf Mexico City/Sci vis to Mexico City/UCDavis
	July 31 Aug 3	Abdel Beltagy	Desert Dev Conf Mexico City/SDSUF
	July 31-Aug 4	Richard Jones	Desert Dev Conf Mexico City SDSUF

Year	Dates	Name	Purpose
	Sept -Nov	Mohamed Abdel Aziz	Sci vis Beer-Sheva Israel
	Oct 23-24	Awad Hussein	Sci vis Idaho, UCDavis
	Dec 21-24	Dov Pastemak	Sci vis to Egypt
	Dec 21-24	Uri Drori	Sci vis to Egypt
	Dec 21-24	Ruth Maklouf	Sci vis to Egypt
1994	April 10-23	Fathy El-Sehely	Sci vis to Univ of MD
	June 28-Sept 24	Ahmed Ibrhaim	Sci vis to Univ of Minnesota related travel to KT CO CA
	Aug 14-30	Mohamed El-Beltagy	Int'l Horticultural Confl Kyoto
	Aug 14 - Sept 12	Assem Shaltout	Sci vis to UCDavis Univ of Riverside Univ of AZ
	Aug 14 - Sept 12	Ahmed Salem	Sci vis to UCDavis Univ of Riverside Univ of AZ
	Aug 14 - Oct 14	Amir Abdallah	Sci vis to Univ of Arizona Tucson
	Sept 16 - 22	Abdel-Beltagy	AID WDC/Boston U
	Oct 16 - Nov 2	Shafik El-Gindy	Univ of Az Tucson/Sci visit to Nurseries AZ & CA
	Oct 30 - Nov 12	Hamdy El Downey	Cucurbitaceae Conf Texas
	Nov 4 - 11	Abdel-Ghany El-Gindy	irrigation Conf Atlanta
	Nov 11 - 25	El-Sayed El-Naggar	Crop science conf Seattle/USDA WDC
	Nov 27 - Dec 12	Aida Saber Ghazy	UCLA
	Dec 11 - 14	Abdel Beltagy	Int l Conf on Development Rome
	Dec 11 - 18	Abdel Azim El-Hammady	Univ of Riverside/Texas A & M